IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication NOVEMBER 3, 1960

Ed Nanno

★ Battelle's Faust and Sifco's Snavely Report—

New Electroshaping Process For Tough Metals p. 77

Construction Equipment Outlook p. 43

The Real News in Steel Earnings p. 50

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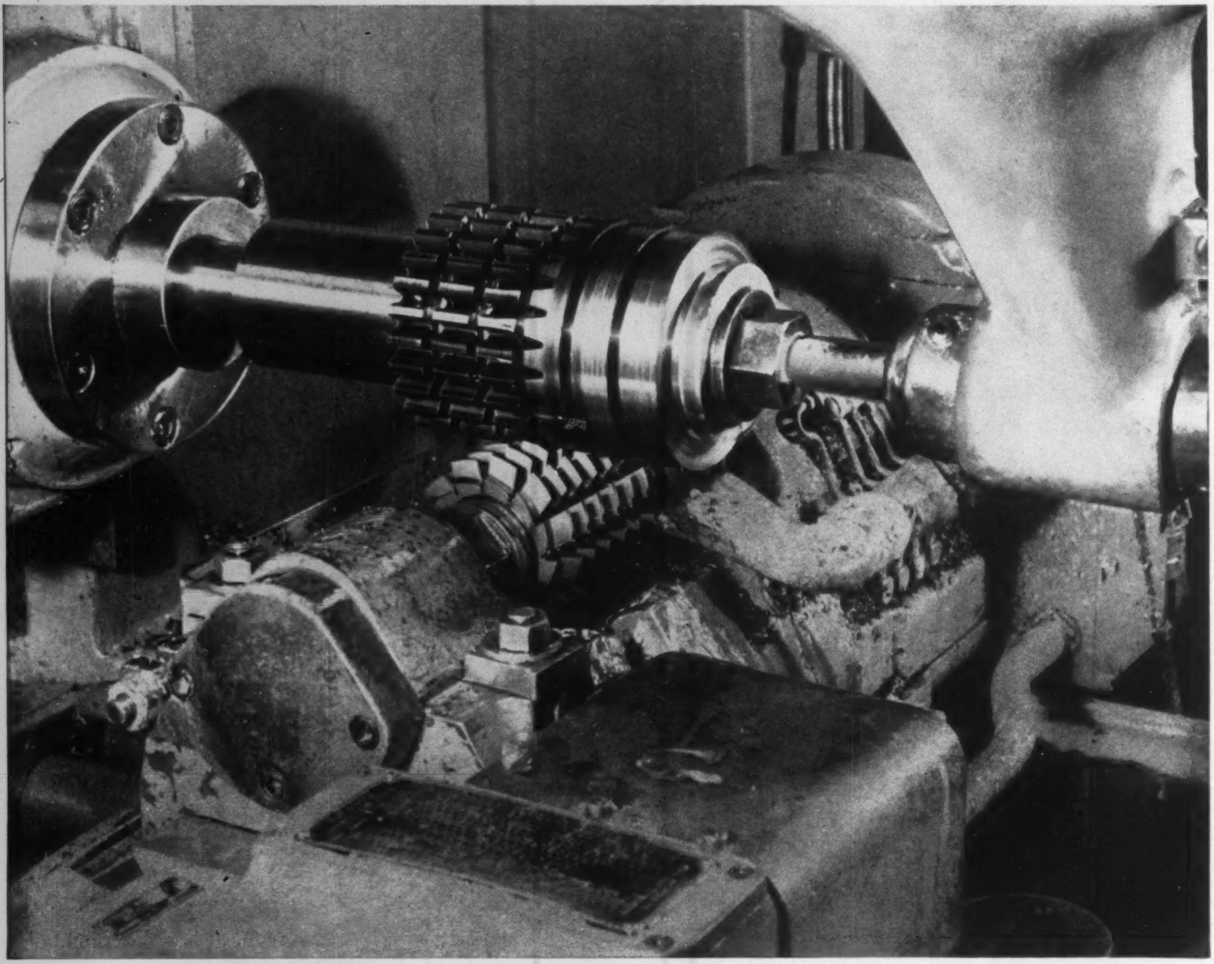

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Chelsea finds more gears can be cut from leaded Aristoloy before the hob needs sharpening. Production can be improved and speeds and feeds increased over non-leaded steel.

Strength and hardness are not affected and the finished part reveals no detectable difference in physical properties from steel previously used.

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COPPERWELD
STEEL COMPANY

ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many who may find it useful to review fundamentals from time to time.

Determining the Depth-Hardness of Alloy Steels

The hardenability of an alloy steel is usually measured by the depth to which the steel will harden under specific conditions of heating and cooling. One of the most conclusive methods of determining depth hardness is the end-quench hardenability test (ASTM A255). In essence, this test is as follows:

A 1-in. round specimen, approximately 4 in. long, is heated uniformly to the proper quenching temperature. The specimen is removed from the furnace and placed in a bracket; then a jet of water at room temperature is played on the bottom face of the specimen without touching the sides. This water jet is kept active until the entire specimen has cooled. Longitudinal flat areas are ground on opposite sides of the piece, and Rockwell C readings are taken at 1/16-in. intervals. The resulting data are plotted on graph paper, with the Rockwell C values as ordinates and distances from the quenched end as abscissae.

Experiments have shown that the points on the hardenability curve approximate the cooling rates at the centers of quenched rounds of various sizes; and that the hardness values at the centers of these rounds will correspond very closely with those shown at points on the end-quench hardenability curve.

In general it may be said that when end-quench curves for different steels approximately coincide, these steels can be treated similarly for equivalent tensile properties in sections of the same size.

A study of hardenability curves reveals that depth-hardness depends upon the amount of carbon present, the alloy content, and the grain size. Manganese, chromium, and molybdenum are the chief elements that promote depth-hardness, while nickel and silicon help to a lesser degree. It should be noted, also, that phosphorus promotes depth-hardness, while sulphur has a negative effect. In normal low-phosphorus and low-sulphur steels, the two elements neutralize each other.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
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BETHLEHEM STEEL

The IRON AGE

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Digest of the Week in

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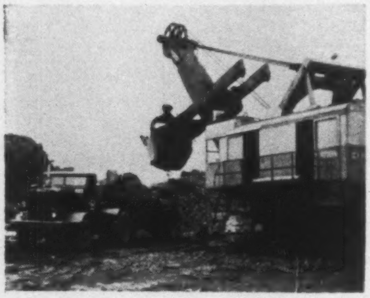
News of the Industry

CONSTRUCTION EQUIPMENT

The Whole Story—Domestic and export sales of construction equipmen are down. But this is not the whole story. In reality, manufacturers are beefing foreign operations at a record-breaking pace. P. 43



INVESTING ABROAD

New Moves — Two U. S. steelmakers have announced ventures abroad. Is it a trend? It's not likely to be a major one, but it underscores the concept of world markets for steel products. P. 45

AUTO SALES

A Rise or Fall?—October sales of new U. S. cars probably set a record for the month. But with inventories of 61s and 60s large, sales for the year may have trouble hitting 6.5 million. P. 46

WELDED TUBING

Gaining Markets — Cold-drawn

Metalworking

Cover Feature

ELECTROSHAPE METALS — C. L. Faust, Chief, Electrochemical Eng., Battelle Memorial Institute, and C. A. Snavely, General Mgr., Sifco Metachemical, Inc., report success in electroshaping forgings into turbine blades with very close contours. P. 77

electric weld tubing is moving rapidly into markets held by seamless products. Larger sizes, made possible by new processing techniques and lower cost account for the gain. P. 47

AUTOMOTIVE

Stainless Engine — A special engine, scheduled for production soon, makes extensive use of stainless steel. Prototypes develop 1 hp per lb of weight. P. 57

Engineering-Production Developments

TV MEASURES BEAMS

In Hot Mill—A wide-screen TV measures shear lengths of I-beam and wide-flange blanks as they emerge from blooming mill stands. With this system, shearmen improve their accuracy. And less physical effort is required. End result: Better product control. P. 81

MECHANICAL BLASTER

Descales Steel Billets — Scrap losses near the finished-product point hurt profits right down the line. One way to guard against flaws in raw materials is to blast descale all stock prior to inspection. One large steel producer plans to run a complete descaling setup by early 1961. P. 82

FOREMEN'S BONUS PLANS

Reduce Production Costs — Industry uses foremen-incentive plans to get certain results. But to be successful, these plans must be supervised properly. Well-developed incentive plans give foremen the chance to increase their pay, while meeting company cost goals. P. 84

SHRINK FITTINGS

Speed Compressor Assemblies—A multi-stage heat-treating unit shrink fits compressor parts for air conditioners. It thermally seals each compressor without using any gaskets, fasteners or adhesive bonds. P. 88

SIMPLE WORK FIXTURES

Save Production Time—Jigs and fixtures are vital to many metalworking operations. They needn't all be deluxe, custom-model items, though. Many can be made from standard shop parts. Whenever possible, composite building of jigs yields several advantages. P. 90

Market and Price Trends

NEW TOOLING ORDERS

Cancellations Hurt—A wave of cancellations hit machine tool builders last month. But it could have its good side. The hope is that buyers attending the Machine Tool Show went home with new ideas and scrapped previous tooling plans, to follow them up with new orders. P. 48

WEST COAST

Will Bethlehem Expand? — There's been much talk Bethlehem would expand in the Farwest to improve its product mix. Most likely guess: More finishing mills to handle coil shipped from the East. P. 59

STEEL SUMMARY

Profits Tighten — Higher labor costs and some higher operating costs will put an even tighter squeeze on steel profits. This will put the pressure on prices, but increases are not likely this year. P. 117

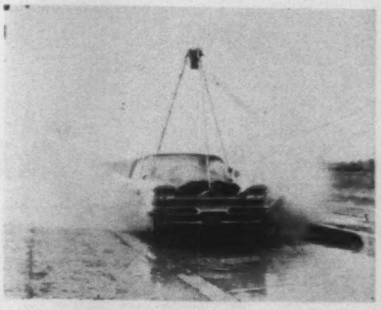
PURCHASING

Steady Prices — Electrical control makers say there is no price hike expected this year. Sales for 1960 are on par with 1959 for the most part, but some have dropped below last year's levels. P. 118

NEXT WEEK

PRODUCT QUALITY

More and more the sales race in consumer products goes to quality products. Consumers look for product improvements, not added features. And service is a headache to them. This market trend has led to stepped up quality control by companies.



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New steels are
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Armco ZINCGRIP Steel

Takes Deep Drawing, Thread-Rolling, Stamping and Forming without damage to coating

Galvanized
Steel

Your company may not make thread protectors but the reasons why Armco ZINCGRIP Steel proved to be the most efficient, lowest cost material for this product may prove of interest to *you*. ZINCGRIP was selected because:

It provides the strength and rigidity of steel.

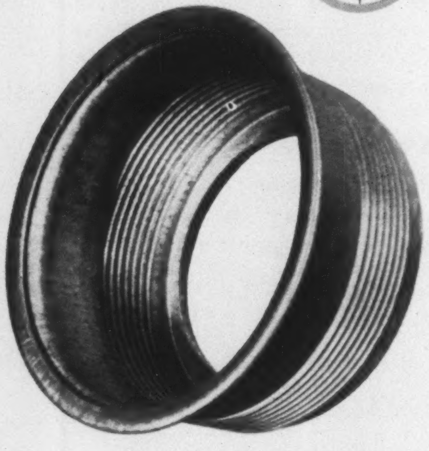
The special hot-dip zinc coating won't flake or peel despite the severest working.

Fabrication is done on standard production equipment.

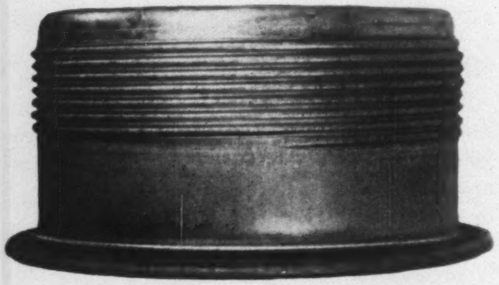
The full-weight zinc coating provides the most economical protection from rust and corrosion. Costs less than painting or plating.

These are reasons why Armco ZINCGRIP Steel has been used by thousands of manufacturers for more than a quarter-century. They also are reasons why this special zinc-coated steel may help *you* cut costs and improve the performance of your products.

Let us send you complete information on Armco ZINCGRIP Steel so that you can thoroughly evaluate its advantages in your programs to increase materials-efficiency and lower production costs. Just write Armco Steel Corporation, 3020 Curtis Street, Middletown, Ohio.



Protective cap for threaded pipe made of .0456" Armco ZINCGRIP Steel. Note the excellent adherence of the zinc coating on this deep drawn part, especially on the sharp bends and the rolled threads.



ARMCO STEEL

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The Home Stretch: A Terrific Campaign!

It won't be long now. Next week it will be either Dick Nixon or Jack Kennedy. And when that news is complete, it will be more objective than what we have had for some weeks.

This has been an unusual campaign. People over 50 would call the candidates young. Those who have seen them in action call them sharp, cool, knowledgeable, personable, and capable—of running a campaign.

After next week, though, it won't make any difference how Mr. Kennedy combs his hair. Or how Mr. Nixon smiles. Nor will it matter what baby they kiss or what oldster they clasp. It won't make any difference whether they wear a dinner jacket at the next ball or white tie and tails.

After next week it could hardly be important who got a ticker tape parade before the election. It won't matter how the girls look at Mr. Kennedy. Likewise, for the people who for years have been saying, "I don't know what it is, but there is something I don't like about Nixon."

All this will be true because we Americans will have made our choice by next week. And this time, as before, we will have to live with our choice. We can't bring in the psychiatrist to explain what we have done.

This campaign has been a tough one for Nixon and Kennedy. There was no father image to help them. No brother image either. Neither is a national hero. Neither is an old-time politician. Both are young fellows who think they have what it takes to be President of the United States.

Next week one of them will find that the job is far different from the statements made in the heat of a political campaign. He will know there are things other than Asian real estate; more problems than Castro.

The one elected will find that the television "debates" were nothing compared to one hour in the White House. He will find that being sharp, smooth, cool, and knowing is but a fraction of what is needed to head this nation.

There is much difference between the two men. The people, by their choice, will indicate without question where they want to go, and how they want to do it.

Having made their choice, the people should take full responsibility for their actions. They can't blame Mr. Kennedy or Mr. Nixon.

Tom Campbell

Editor-in-Chief

CUSTOM-MADE

Stainless Strip from Allegheny Ludlum

Stainless steel strip problems are solved at Allegheny Ludlum. Excellent forming characteristics, close gauge control, special analyses, color matching, and special finishes are only a few of the plusses A-L offers to solve your problems.

Here are some examples of A-L stainless strip made to solve individual problems:

- Type 430 with low roping quality.
- The economical 200 series . . . line free! And with increased ductility.
- Type 430 with a bright mirror finish, free of gray streaks.
- Type 302 with quality that enables a fabricator to form a coffee percolator in nine draws without an intervening anneal.

Your individual needs will get the attention you want them to have at Allegheny Ludlum. Tell your A-L representative the end use, fabrication procedures, etc., for your strip. He will work with A-L metallurgists, processing engineers, and technical men to give you the best stainless strip, custom made for your use.

Allegheny Ludlum service in stainless strip is backed up by an outstanding record for on-time delivery. Large stocks of hot bands enable A-L to give you quick service on all stainless strip needs. And A-L finished stocks give you quick, even overnight, delivery on many gauges and analyses.

For consistent temper, tolerances, and finish in stainless steel strip, call your Allegheny Ludlum salesman, or write: Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pennsylvania. Address Department IA-11-1.

2576

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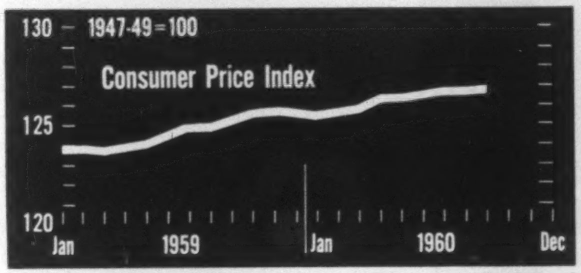
EVERY FORM OF STAINLESS . . . EVERY HELP IN USING IT

Will Election Hurt Business?

Don't discount the influence of the election and its result on business. Washington economic experts point out election and post-election years have been bad for business. In past election years, production has sagged 32 pct of the time. It declined about 53 pct of the time during past post-election years. In these off years, the decline has been 18 pct. Reason is the uncertainty and concern created by the campaign and the selection of a new president. So far, 1960 has followed this trend. There's a good chance 1961 may, too.

Cost-of-Living Keeps Rising

Despite attempts to hold prices down, the cost-of-living keeps climbing. In September the Cost-of-Living Index again hit a new high, topping the previous high of July and August by 0.2 pct. The new Index of 126.8 (1947-49-100) was also 1.3 pct over September, 1959. All the major price groups which make up the index, except transportation, have climbed over year-ago levels.

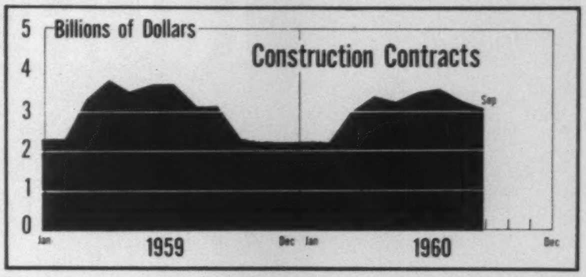


Correction's End: Mid or Late '61?

A mild economic dip followed by recovery in mid-1961: That's what more than 300 economists polled by F. W. Dodge Corp. predict for the months ahead. However, economists for manufacturers are less optimistic. According to Dodge, they predict a rise through the end of '60, then a dip to a low in second quarter '61 with recovery in the final half of the year. Reasons for concern about next year's prospects include: Lack of strong consumer demand, the profit squeeze, overcapacity, a drop in capital spending, unemployment, and inventory adjustment.

September Construction Tops '59

Bright spots are hard to find in the present business picture, but construction awards are doing their part. In September, for the second month in a row, construction contracts topped year-ago levels, F. W. Dodge Corp. reports. September awards were $3.1 billion, up 2 pct over September, 1959. The advance beyond year-ago levels was lead by awards for non-residential building, (up 12 pct), and heavy engineering (up 22 pct). Residential building continued below a year ago, off 13 pct from September, 1959. However total construction dipped slightly from August, 1960 levels on a seasonally adjusted basis.

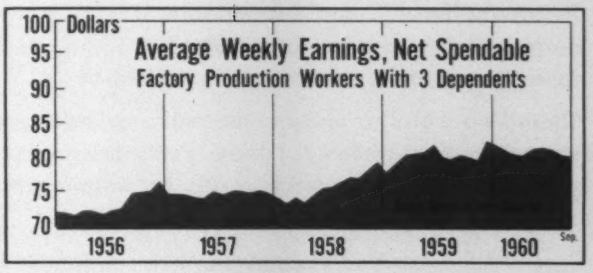


Pattern for Space Spending

Space age spending will build up to about $2 billion a year by the mid-1960s. Then it will level off. That's the prediction of Dr. Homer Joe Stewart, director of Program Planning and Evaluation for the National Aeronautics and Space Administration. He believes success of America's long-range civilian space program hinges on steady support from Congress and the Administration in power. Too much emphasis one year followed by too little the next could "tear the program to pieces," he adds.

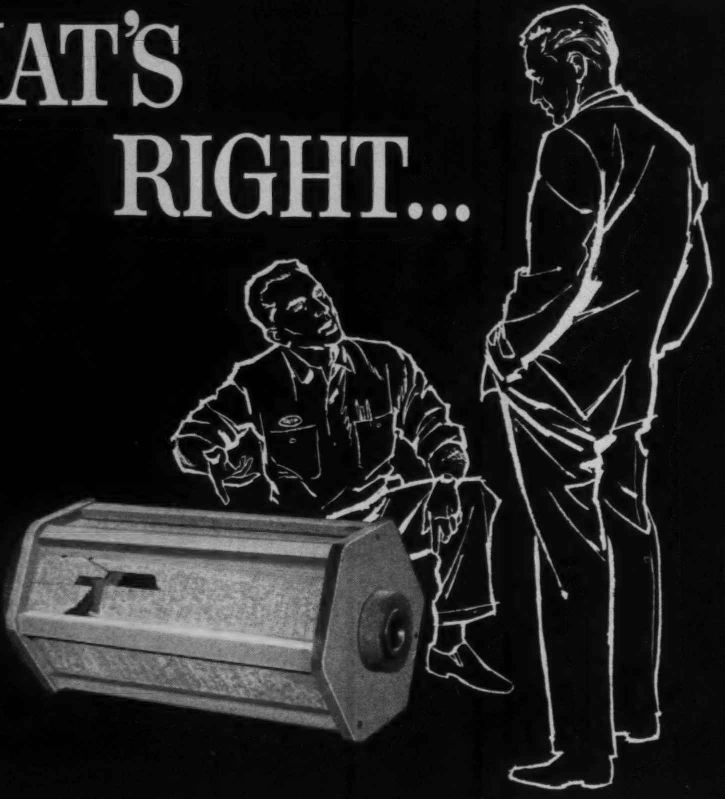
Spendable Earnings Decline Slightly

How much the consumer has to spend—and spends—is being closely watched for its effect on business.



Latest Dept. of Labor figures show factory workers' spendable earnings are holding level. Net spendable weekly earnings for September for a worker with three dependents were $80.87, compared with $80.91 in August. For September a year ago they were $80.36. Higher prices have hurt, however. The buying power of current earnings is 0.6 pct lower than a year ago.

THAT'S RIGHT...



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IUE: Does Carey's Fumble Count?

When IUE president James Carey fumbled in negotiations with General Electric Co., he undoubtedly put other union leaders on the spot. They are sure to meet stiffer opposition when the time comes for them to start knocking heads with management over the bargaining table.

UAW president Walter P. Reuther will be the next to be put to the test. Auto industry contracts expire next fall. Automakers can count some success resulting from their firm stand in 1958. They are sure to try to improve the score.

However, whatever the UAW wins or loses will help shape the demands in other industries. How strong a stand the steel industry takes in 1962 against USWA president David J. McDonald and the Steelworkers could well depend on how tough—and successful—the automakers are next year.

Industry management in general may assume that, based on GE's success, now is the time to clobber unions with a take-it-or-leave-it ultimatum at the bargaining table. This could be dangerous—unless management does its homework.

GE's successful tactics cannot be adopted outright as standard procedure by auto, steel, or other industries. UAW and USWA are strong unions with determined leaders and strike-toughened members.

Bans Against Strikes And Lockouts Grow

Managements are apparently demanding — and getting — bans against unauthorized work stoppages. In return, they are agreeing not to lock out workers.

No-strike clauses and no-lockout pledges in union contracts have shown an increase since 1957, says Bureau of National Affairs.

Survey shows 94 pct of contracts sampled have some form of no-strike clause. This is up 5 pct from 1957. In the same period, no-lockout pledges were found in 84 pct of contracts, up from 76 pct.

Absolute bans against strikes appear in 48 pct of contracts; conditional pledges appear in 46 pct. In 1957, only 37 pct of contracts had absolute no-strike clauses, 52 pct conditional.

Nearly 40 pct of no-strike contracts call for penalties for individuals taking part in wildcats. And nearly all of these specify some form of discipline or discharge.

UE: Signs With GE

United Electrical Workers (independent) reached agreement with General Electric Co. The contract, covers 10,000 employees at 13 GE plants.

However, the UE contract includes the "retraining and reassignment" plan. Workers with at least three years seniority may be selected by the company for training or for assignment to a new job with pay at 95 pct of their old job rate.

UE also took the option of a 3 pct wage increase in April, 1962, plus eight paid holidays and four weeks vacation after 25 years.

UAW: Ike Asks Joint Talks

On cue from President Eisenhower, the UAW is once again urging establishment of permanent automobile industry joint management-labor conferences.

"Labor and business leaders must sit down in a calm atmosphere and regularly discuss—far removed from the bargaining table—their philosophies, their needs, and above all, their common responsibility to this free nation," the President recently told auto executives.

Such talks have long been a pet goal of UAW president Walter P. Reuther. In a letter to the presidents of the Big Three automakers, the union leader again proposed such a conference to be made up of "top level, policy making executives" from the industry and union leaders.

"Meetings, he suggested, should be held four times a year. Scope of the conferences would be wide, including the President's suggestions, economic growth, inflation, import competition, and technological change. Collective bargaining problems (negotiating) would be barred.

Immediate reaction from the Big Three was that each was taking the proposal under advisement. Roughly translated, it means **they want no part of it—if they can avoid it.**

For one thing, discussion of "technological change" means talking about the introduction of automation. **This, they feel, is none of Mr. Reuther's business.** And they believe such talks would lead to insistence by Mr. Reuther for a voice in company policy making.

There are also serious doubts as to what—if anything—is to be gained in such talks. Last May three members each from management and labor met to map plans for a series of industrial peace talks. For all practical purposes, the only thing to come out of the meeting was a pledge to meet again. As yet, they haven't.

GOODYEAR

Now...
to remake belting
history..
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INDUSTRIAL
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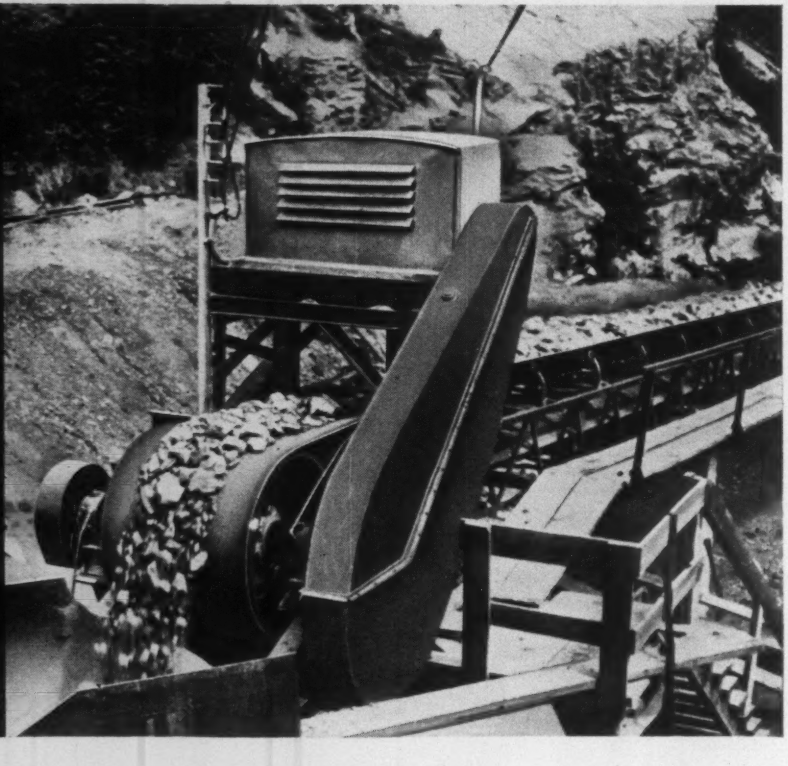


...the conveyor belting built for the belt-killers

This is it! New Industrial UNIFLO is the *first* woven-carcass rubber belting specifically designed to make history in hard-rock mining, quarrying, steel mills, pulp mills, foundries and the like.

New Industrial UNIFLO construction is available in a variety of compounds and gauges—including heat- and oil-resistant types. And extensive tests—underground and above-ground alike—have proved its superior capabilities under the toughest operating conditions.

To be specific, UNIFLO construction has . . .

. . . **proved** its unparalleled resistance to internal rupture caused by trapped material or pulley build-up

. . . **proved** its tear-resistance 3 times as great as comparable synthetic fabric-reinforced belts—10 times as great as comparable cotton-reinforced belts

. . . **proved** its excellent impact-resistance

. . . **proved** its unusually fine cover adhesion and cut-resistance

. . . **proved** its outstanding troughability and trainability

. . . **proved** its exceptional edgewear resistance

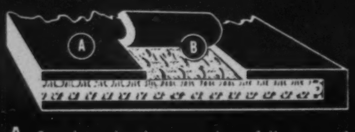
. . . **proved** its top-rank fastener-retention—handling wet or dry materials

But these are only the highlights of the great new Industrial UNIFLO Belting. For complete details, check with the G.T.M. – Goodyear Technical Man – through your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

GOODYEAR INDUSTRIAL PRODUCTS

GTM-Specified

Industrial UNIFLO conveyor belting for severe above-ground service



A Seamless, tough covers in a full range of compounds and thicknesses for superior protection against cuts, abrasion, heat and oil

B Single unit carcass of high-tensile, interwoven yarn bonded to the cover under high pressure to give you exceptional strength and fastener-holding qualities — good troughability and trainability

Lots of good things
come from
GOODYEAR
INDUSTRIAL PRODUCTS

Uniflo—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

WASHINGTON

By R. W. Crosby

★"Unwanted" Funds Spent

The Eisenhower Administration has quietly increased defense spending six times since Ike submitted his budget to Congress last January. Now, the seventh increase is just as quietly being made.

The new increase—$8 million for antisubmarine warfare research — follows increases for missiles and satellites, Army modernization, airlift, and submarines.

Thus the Administration is spending most of the money Congress added to Ike's budget. This was money the President did not want. He asked for $40,873,000,000 and got $41,356,963,000.

When he said he would not spend most of the half billion more, a controversy over "freezing" defense money began. Now the Administration is "unfreezing" the funds with as little fanfare as possible.

The quietness with which the funds have been added on probably stems from political expediency. With the election so close, the Administration doesn't want to admit the Democrats were right. Senate Democratic Leader Lyndon Johnson — now the Democratic vice-presidential candidate — was the most critical of the President's defense spending plans.

But, despite Democrat taunts of "we told you so," more increases are in the offing. About $388 million is still frozen at the Pentagon. Some of it will soon be put out for more Army modernization, the B70 bomber, and other programs.

Now, apparently, all parties agree that a defense speedup is essential to the nation's defense.

■ Ore to Keep Duty-Free Status

Predictions are that the U. S. will not modify the current duty-free status of iron ore imports into this country.

Among the reasons given for forecasting that tariffs and quotas will not be imposed on iron ore imports:

1. The Tariff Commission, which is now studying the problem, is believed to think that the problems of domestic iron ore producers have been caused mainly by local taxes, not imports.

2. Producers in countries like Canada, who ship large amounts of iron ore to the U. S., are threatening to retaliate against American imports if the duties were put on.

The Tariff Commission has been asked to impose the tariffs by producers from the iron mining areas of Minnesota and Wisconsin. The major steel companies oppose any tariffs or quotas on ore imports.

■ Military Surplus Sales Plan Changed

The military surplus property sales program will be completely changed by the first of the year. The Defense Dept. is revamping sales procedures to simplify buying, especially for small businesses.

The new program will use a short form application for prospective buyers. It will centralize its military sales and information offices. And it will simplify bidding methods.

Each year surplus used military property costing more than $6 billion when new is sold to the public. More than 125,000 contracts are written each year covering 550,000 separate parcels of surplus property from typewriters to submarines.

■ Internal Revenue Has New Tax Service

The Internal Revenue Service has a new plan to help businessmen settle tax disputes with the government.

The idea involves a system of informal conferences between tax men and worried or confused taxpayers. The taxpayer can request a conference with a revenue agent from the nearest of 61 district offices in the U. S.

The agent and the disgruntled taxpayer are expected to arrive at an agreeable settlement. Tax men say the new procedure will save taxpayers time, trouble and money by eliminating the long and expensive older methods.

■ New Checks On Defense Bidding

Government trustbusters are tightening their crack-down on "rigged" bidding on government contracts.

BICKS: Another Crack-Down.

Robert A. Bicks, head of the Justice Dept., Antitrust Division, is enlisting state aid in finding and prosecuting cases of identical bidding. Special emphasis is being put on bidding for Federal, state, and local construction projects.

Vaughn Haynes, right, manager of production engineering, discusses "trap" line scheduling with Wilfred Pascoe, superintendent of press room.

Chrysler blanks strip steel by "trap" shearing on Wean coil processing line

Trapezoidal shearing from coil is, in many cases, the most economical way to prepare blanks for subsequent press operations. Two, independent, pivoting shear heads allow selection of the most economical proportions of the blanks for the finished shapes. This "tailoring" of the material to the end parts eliminates much of the material loss that would result if these same parts were stamped and drawn from square-cut sheets.

Wean has designed and built almost all of the "trap" shear lines used today. The installation shown is at Chrysler Corporation's mammoth Twinsburg, Ohio stamping plant. This Wean coil processing line incorporates strip cleaning, flexing, leveling and shearing operations that turn as-received mill coil into sheet, ready for press work.

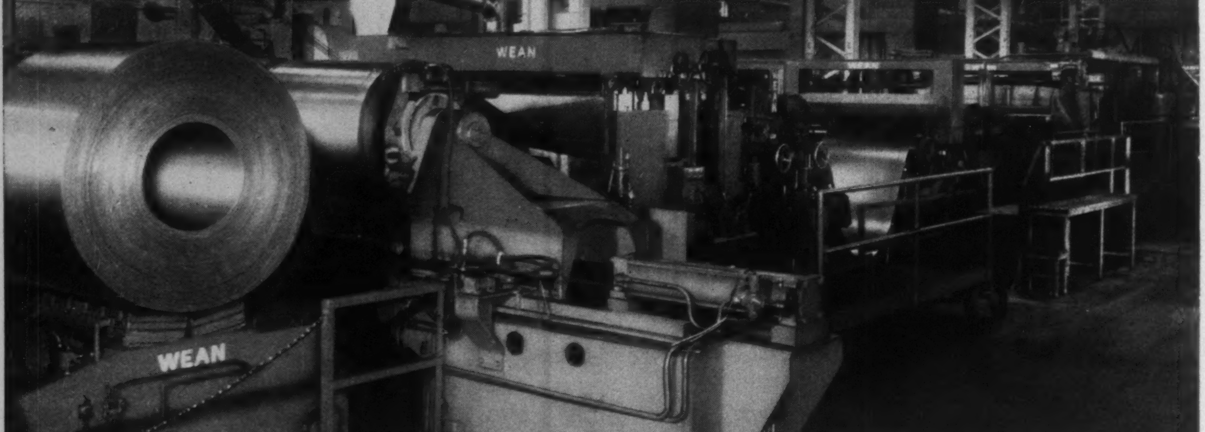
Today, more and more alert metalworking firms are turning to coil processing as one of the answers to rising production costs. If your firm uses approximately 500 tons/month of flat-rolled steel, you may be missing major material and overhead savings if you still purchase in sheet form.

An experienced Wean representative will be able to tell you, or your production executives, if coil processing can cut your costs—and how much. Many firms have amortized the equipment costs involved within one year.

WEAN EQUIPMENT CORPORATION
CLEVELAND 17, OHIO

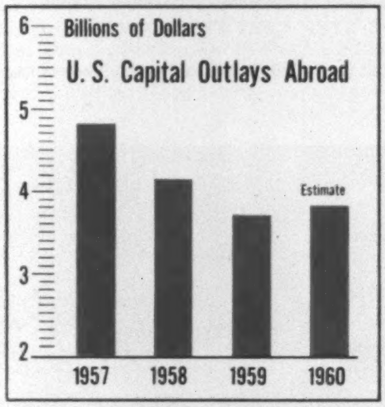
WEAN

Wean trapezoidal shearing line at Chrysler's Twinsburg Stamping Division plant produces blanks for body stampings from coils weighing up to 30,000 pounds.



Capital Outlay Abroad on Upswing

Capital outlays abroad by U. S. industry are expected to total about $3.9 billion in 1960, according to the Office of Business Economics, Dept. of Commerce.



This figure is slightly higher than the 1959 total, but is far below the $4.8 billion peak reached in 1957.

Manufacturing concerns expect foreign outlays of $1.3 billion in 1960, about 15 pct over the 1959 amount. This is led by a rise of over 30 pct in Europe, with lesser increases in other areas. Outlays by the petroleum industry abroad for equipment, property and plant remain about $1.6 billion, about the same as 1959.

Investments in Europe, about 40 pct of the total, are rising sharply, both in the Common Market Countries and Great Britain. In Great Britain, outlays of about $300 million in manufacturing scheduled for 1960 are about the same as 1957. About one third of the outlays are in the transportation equipment group.

Visiting Steelmakers Not Always Welcome

With an eye on the extent of steel imports, some U. S. steelmakers are quietly tightening up on their once open-door policies to foreign competitors.

One top executive says his company is turning down all proposals by steelmakers from abroad for "know-how" agreements. And, he says, this line of thinking is being applied throughout the industry.

When Buying Overseas Be Cautious, Specific

To get best results when buying overseas, study the specific situation you are interested in and don't take a general viewpoint.

This is the advice of John R. Blinch, director and secretary of the Purchasing Officers Assn. of Great Britain and executive secretary of the European Federation of Purchasing.

One big mistake many companies make, he says, is that they don't realize that interpretation of prices and specifications vary greatly in Europe. And quality standards are different than they are in the U. S.

In some areas, final pricing follows bargaining, while in others quoted prices are firm. With quality, sometimes it is better to buy a higher grade than needed to insure proper quality, and in some instances the opposite it true.

The best advice, says Mr. Blinch, is to consider your foreign procurement as an investment and act accordingly.

Venezuelan Politics May Hurt Trade

Venezuela's future as an attractive area for U. S. investments and markets may be hanging.

When the Republican Democratic Union party suggested the end of President Betancourt's rule by party coalition, his troubles multiplied. But the action last week, when RDU members of the cabinet offered their resignations, brought into the open the sour undercover troubles.

For some time the RDU—which sides with Cuba's Castro—has been unhappy with the middle-of-the-road (Venezuelan road, that is) policies of President Betancourt.

The end result of this bid for power by the RDU may mean a further decline in business in Venezuela, further postponement for public works, and a general nervousness among foreign investors. The next few months will determine the strength of the Betancourt group, the Democratic Action party. (The third party—Social Christians—is a rightest group which will support President Betancourt against the RDU if things get too rough.)

Japanese Take a Look At Canadian Iron Ore

The Japanese search for iron ore goes on, but now it's getting a little closer to home. Mining men report growing Japanese interest in ore deposits in Western Canada.

This is an area that has never been developed, but discussion is underway on the opening of mines there with ore moving directly to Japanese mills. At the same time, U. S. and Canadian companies indicate they would be interested in developing the ore properties too.

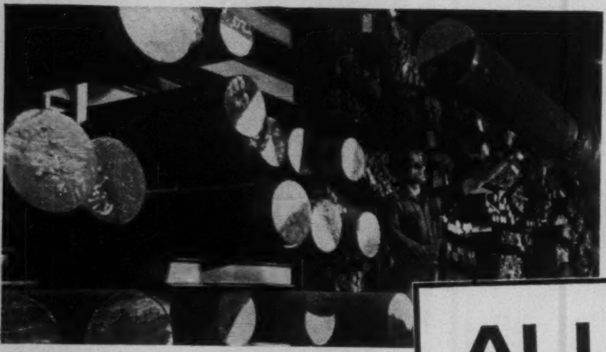
British to Boost Steel Output

British steelmaking is getting set for another shot in the arm.

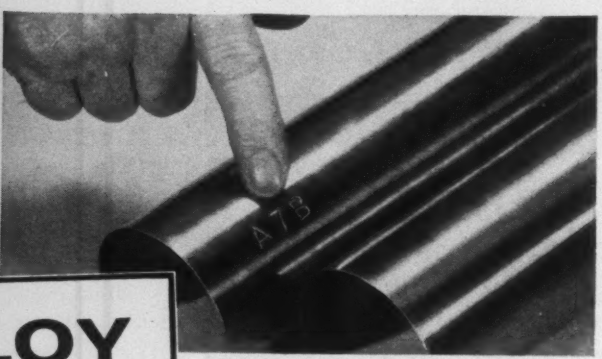
Dorman Long & Co., North of England steelmakers, which has spent $170 million on capital investments since the war, has announced a new development program costing $100 million. This, and another project under way, will add 800,000 tons of capacity.

ALLOY STEELS

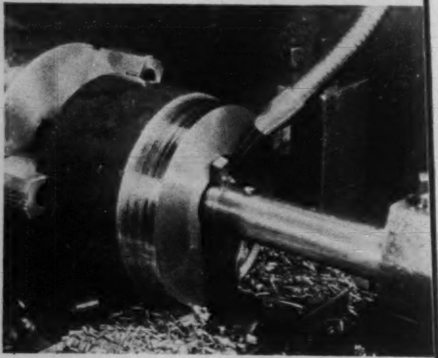
in Stock at Ryerson



WIDEST SELECTION—You choose from the nation's largest and most diversified alloy steel stocks at Ryerson—available to meet even your largest requirements.



8-STEP CERTIFICATION—Our unique 8-Step Certified Alloy Plan assures test-proven quality and predictable performance every time . . . guides heat-treatment . . . cuts reject loss.



WORLD'S FASTEST CUTTING . . . that's Ryerson's Rycut series of alloys (see listing). And Rycut heat-treated has carbon matched to bar size for best combination of machinability and strength.

TECHNICAL HELP—Your Ryerson representative is Metalogics-trained to suggest the best alloy for each application . . . steels to do the job faster, better—at less cost.

DEPENDABLE DELIVERY—Big-capacity facilities and an experienced staff with a service attitude assure quick delivery of any quantity—within hours if needed.

METALOGICS
RYERSON PLUS VALUES

BE "METALOGICAL"—All the plus values of Ryerson service on alloy steel add up to the Ryerson science of giving you "optimum value for every purchasing dollar." So be "Metalogical"—call Ryerson.

BARS
Hot rolled and cold finished

Low Carbon Case Hardening	4615/20 E8615 8620 8620 leaded E9310 Nitralloy 135 modified
Heat-Treated Medium Carbon	4140 4140 TG & P 4140 leaded 4147/50 leaded 4340 Rycrome® Rycrome TG & P Nikrome® Nitralloy
Medium Carbon Annealed Direct Hardening	4140 4140 leaded 4147 4147/50 leaded 4340 E6150 8647 leaded
Rycut Free Machining	Rycut® 20 Rycut 40 and 50 annealed Rycut 50 modified annealed Rycut Heat-Treated

PLATES

8620 E8615 4140	T-1 Aircraft Quality 4130 & E4130

METALOGICS
RYERSON PLUS VALUES

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

RYERSON STEEL®

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

SERVICE CENTER PLANTS: BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT • HOUSTON • INDIANAPOLIS LOS ANGELES • MILWAUKEE • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE • SPOKANE • WALLINGFORD

Air-Jet Screwdriver

A pneumatic screwdriver sets screws in metal or wood up to 20 ft from the feeding device. It handles up to 70 screws per minute. This speeds assembly operations. The portable unit connects to standard air lines. It's convertible to almost any head style and it drives a wide range of screw sizes.

Suppressors Tame Blasts

When plant safeguards fail, a new system suppresses incipient explosions. It acts within a few thousandths of a second to snuff out a blast before destruction can occur. Thus, the new blast suppressors offer active, rather than passive, protection against wide-spread industrial explosions.

Zinc Improves Latex Paint

Zinc oxide adds desirable properties to paints. It contributes good cleansing, color retention, mildew resistance and resistance to tannin staining. But until now, it hasn't been used with latex paints. Why? Because the oxide's reactive pigment decreases package stability. A new latex resin, polyvinyl acrylic-copolymer, corrects this latex-paint-formulation problem.

Handle Hot Metals

Titanium tongs speed the handling of hot metals. These lightweight, high-strength tongs also reduce worker fatigue. As a result of titanium's low-heat conductivity, tong handles remain cool. This overcomes the temptation to quench the tongs in water. Quenching causes embrittlement problems when steel tongs are used.

Gas Enters Forming Field

In explosive forming, gas may have advantages over other methods. When solid or liquid explosives are used, peak pressures exceed 1-million psi. These pressures form the part within a few microseconds. But shock waves are reflected. Each wave reinforces its successors. Resulting pressure buildups can crack the workpiece. Gas explosions, on the other hand, yield pressures up to 200,000 psi. These blasts last several milliseconds and they produce better shock patterns.

Speed Construction Work

Portable milling heads, working with conveyors, may soon be tried for construction grading and excavation. Machinery builders are looking for a high-speed head that would cut through rocks, tree roots and other obstructions. These portable units may someday replace present earth-moving methods.

Reduce Mill Downtime

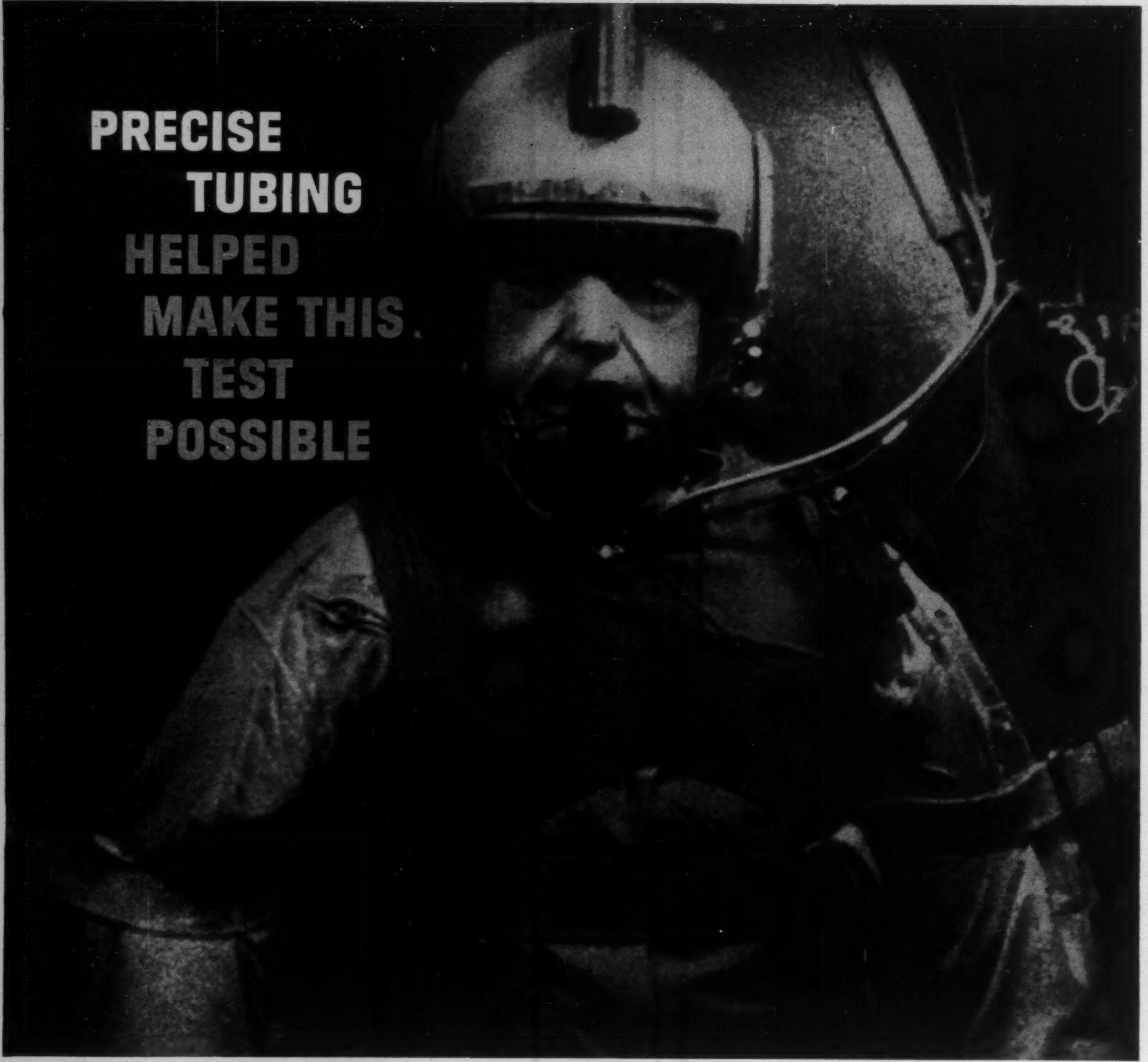
A new memory-type fault detector monitors a rolling mill's contact circuit. It indicates, with a memory carry-over, all malfunctions. This simplifies trouble-shooting. The fault finder has a time delay to preclude false indications in case of contact bounce. Malfunctions trigger a control rectifier which turns on a light. The newcomer can also check any circuit or device within the mill with complete isolation.

Deeper Oil Wells?

All-aluminum drill pipes promise to double the capacities of existing petroleum-drilling rigs. Aluminum weighs about half as much as steel. Thus, it penetrates up to twice as deep with the same rig. It's claimed that the easily-transported aluminum pipes also outlive steel pipes. A 500-ft test string of aluminum has drilled 60,000 ft with almost no wear.

Prevent Overloading

Damage resulting from oversize workpieces in automatic, as well as manual machine tools, can be prevented by a new sensing device. This device consists of a meter with dual pointers. It automatically stops the machine if there's any danger of overloading. One pointer monitors the maximum load allowed by the setup. Its mate indicates the actual load on the workpiece.



That's a test pilot undergoing several "G's" in one of those human centrifuges. His life and the progress of future generations depend on the performance of many tubular parts built to rigid specifications, tight tolerances.

We make stainless steel and nickel tubing in mechanical, aircraft, capillary and hypodermic grades in sizes up to 1 inch OD—plus an amazing variety of "specialties" such as super and "exotic" alloys, glass-to-metal sealing alloys and clad metals.

In addition, we produce a vast line of platinum products and chemicals that have been used by industry for over a century.

We are unique because of our ability to *work these metals to such tiny, precise forms.* Bulletin No. 12 describes our tubular products—Catalog No. 5 describes our platinum products. Write for them.

BISHOP

Tubular Products Division **J. BISHOP & CO.** *platinum works* 35 KING STREET, MALVERN, PENNA.

A JOHNSON MATTHEY ASSOCIATE "METALS FOR PRECISION AND PERFORMANCE"

MORGAN WORCESTER

4-STRAND ROD MILL

American Steel & Wire Division, United States Steel Corp.

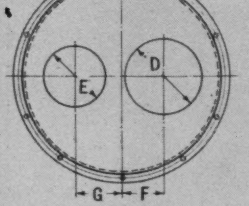
CUYAHOGA WORKS, CLEVELAND, OHIO

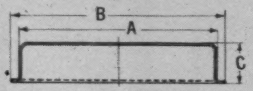
Rolling tonnage records
such as an average of 551 tons per eight hour turn
for 83 consecutive turns.

MORGAN CONSTRUCTION COMPANY WORCESTER, MASS.

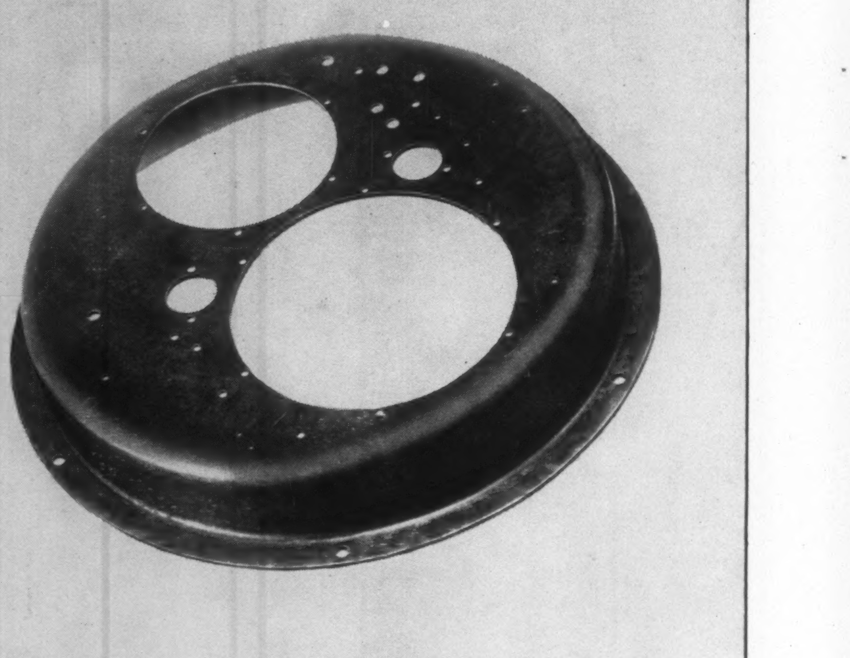
ROLLING MILLS • MORGOIL BEARINGS • WIRE MACHINERY • REGENERATIVE FURNACE CONTROL • EJECTORS • GAS PRODUCERS

Metal Forming Ideas





A	B	C	D	E	F	G
36	40	6¼	16¾	12⅝	7	8⅝
48	53	8½	20	16½	11¼	10¾
60	65⅛	12⅛	23⅜	18⅝	12⅝	14



Cuts costly operations on component part

One operation pin points 63 holes in dish-stamped 60" diameter boiler door—completely eliminates accumulative error

Exact dimensional sizing and accurate placement of all holes—eliminating any chance of accumulative error—is a primary requirement in the dished boiler doors being produced for the Cleaver-Brooks Company.

Equally important is close adherence to a tolerance of plus or minus 1/16" on diameter, and flat across the flange within 1/16"—even after the gang-piercing operation in order to guarantee perfect fit and draft-free closing seal.

Gang-piercing of the required holes in the Cleaver-Brooks boiler doors—involving a one-hit operation—insured identical dimensional and location accuracy of all holes at lower cost.

When other fabricating methods proved unsatisfactory and too expensive, Cleaver-Brooks turned to COMMERCIAL. Dies for the stampings were designed and produced by COMMERCIAL and the boiler doors are now turned out on a regular production basis on a 2000 ton mechanical press with an 8 x 16 ft. bed and a 30 in. stroke.

The close dimensional tolerances of the multiple holes in the boiler doors eliminate the need for further reaming. The exact spacing of all holes, which is completely free of any accumulative error, makes it possible to mount boiler accessories directly to the boiler doors without any assembly time lag. Also eliminated, thanks to gang-piercing, is the need for any flat surface facing before accessories can be mounted.

Other costly and time consuming operations formerly required, such as flame cutting, rolling rings, machining edges, welding, weld inspection, cutting holes, etc., not to mention the use of many expensive fixtures, have now all been eliminated by the heavy stampings produced by COMMERCIAL.

The greater accuracy afforded by the stamping method obviously leads to many important savings in the complete production operation—invariably means lower product cost. Because accuracy in stampings is identical—almost automatic—it involves no time lag, requires less man and machine hours to gain. At the same time, greater accuracy naturally means fewer rejects and less waste of raw material.

Whatever your particular component part design problem may be, we may be able to suggest and help you work out a practical and economical solution based on our more than 30 years' experience in forming metals. Send details of your problem to Commercial Shearing & Stamping Company, Department K-45, Youngstown, Ohio.

COMMERCIAL
shearing & stamping

LETTERS FROM READERS

Cogent Comments

Sir—I just had a chance to read your recent editorial on the role of government under part 4 ("Government's Role: How Far Should it Go?") of the series "Our National Issues." I want to pass along my personal commendations for some exceedingly cogent comments concerning government and the railroads. Certainly, if this "Alice in Wonderland" type of economic and political thinking is to be changed at all, it will be done only through the informed and aroused opinion of the American people. Your editorial does a wonderful job of pointing up this essential public interest in revising and updating the old laws and regulations to conform with 1960 conditions.—James Sites, Washington, D. C.

Needs Name

Sir—On p. 57 of the Sept. 22nd issue of The IRON AGE in the Market Planning Digest, you mention the fact that a major press manufacturer is offering tooling service for cold extrusion of aluminum. Would it be possible for you to give us the name of this press manufacturer? — Howard A. Fromson, Fromson Orban Co., Inc., New York.

- **Contact Verson Allsteel Press Co., 9314 S. Kenwood Ave., Chicago 19, Ill.—Ed.**

Our Greek Lesson

Sir—As a faithful reader of your magazine, I also read the very interesting article on p. 135 of your Oct. 6 issue, "Microscope Shows Tired Atom." May I comment that I have never heard the word "metology" yet, but I know the word "metrology." Did you not lose the "r" somewhere? The name "metrology" for "measurement science," broadly used everywhere is a combination of two Greek words: metros and logos, and means word about measuring.—Antoni Niedzwiedzki, General Electric Co., Detroit, Mich.

- **You're right, we dropped the "r".—Ed.**

High-Strength Steels

Sir — Your recent article on "High-Strength Steels" is excellent and we would appreciate five reprints.—H. F. Folk, American Car and Foundry Div., ACF Industries, Milton, Pa.

Sir—Please send me a copy of the reprint on "High-Strength Steels." This will be a valuable addition to the working file used by our machine designers.—Neil M. Waterbury, Owens-Illinois Technical Center, Toledo, O.

Sir — I have read with much interest your recent article on "High-Strength Steels." As offered, I would like to receive reprints of the same.—H. Geissler, Westinghouse Electric Corp., Hyde Park, Mass.

Sir—We have appreciated reading the article on "High-Strength Steels," which appeared in the Oct. 6 issue of The IRON AGE. We feel it has much advantage in that it is concise and to the point, and gives detail that is needed on the application of this type of material. Please forward us three copies of this article. — R. Guthrie, Ford Motor Co., Dearborn, Mich.

Sir—We have read with interest your enlightening article. Please send us some reprints.—Lloyd F. Burton, Great Lakes Steel Corp., Detroit, Mich.

- **All of these reprints are in the mail.—Ed.**

Pictures Transposed

Sir—In your Sept. 1st issue, you kindly ran an item about the appointment of John B. Holland as our automotive design manager. We're grateful, but as it happens the picture under which the reference appears is not that of Mr. Holland. Mr. Holland's photo appears over the name of Dr. R. F. Patrick—A. T. Thibadeau, Oakite Products, Inc., New York.

HERBERT W. WESTEREN, Assistant Director of Hayes Research and Development Group, tells about the . . .

"VACUUM AGE" OF HEAT TREATING

A major New York manufacturer of aircraft equipment recently reported their Hayes Vacu-Master Cold Wall Furnace was paying off in many ways — providing rapid cycling, simplified work handling, and complete production flexibility. Additionally, the vacuum furnace has eliminated need for atmosphere equipment . . . and produced work (stainless steel brazing) of maximum strength and finest grain structure. Best of all, it's economic!

Similar Success Stories come to us from other users of Hayes Furnaces. Successful heat treating of "exotic" metals (tantalum, titanium, niobium, etc.) in the 2600 to 4500°F range. Successful sintering, hardening, annealing, and degassing at high production rates. Success stories all around!

The "Universal Atmosphere" has Universal Applications

Unlike other "atmospheres," vacuum has virtually no job limitations. Here's where the ingenuity of Hayes development engineers comes into play. By coordinating furnace design with job requirements . . . and by PROVING RESULTS in the Hayes lab . . . Hayes vacuum furnace engineers assure the customer a "RESULTS GUARANTEED" installation every time. I'd like to invite you to advance your heating into the "vacuum age" . . . with HAYES!
Write for vacuum Bulletin 5709A.

C. I. HAYES, INC.
Established 1905
821 Wellington Ave. • Cranston 10, R. I.

ELECTRIC FURNACES

It Pays To See Hayes for metallurgical guidance, lab. facilities, furnaces, atmos. generators, gas and liquid dryers.

Allison-Campbell
ABRASIVE CUTTING KNOW-HOW
ACCO
for Better Values

With this Campbell Machine, you can--

Cut 6-inch Diameter Hard Alloys-Cleanly and Accurately-in Less Than 3 Minutes!

• This Campbell wet abrasive cutting machine—the Model 406—will cut tubing, bar stock, angle iron, or any other shape up to 6" round or square—and it will cut practically *any* material, including the new super alloys and exotic metals. Like all Campbell machines, it's designed to give *accurate* cuts, quickly and cleanly.

HIGH SPEED—4 to 8 seconds per square inch is the normal cutting speed for all Campbell wet abrasive cutting machines. For instance, you can cut 6" diameter hardened steel in less than 3 minutes.

ACCURACY—Campbell machines are production machine tools. They cut within close tolerances to reduce rejects and scrap loss. For example, the Model 406 will cut 3" diameter material to lengths within ±.010", 6" diameter within ±.030".

FINE FINISH—Additional finishing operations are rarely required. There is no burn, and burr has been reduced to an absolute minimum.

POWER OSCILLATION—On an oscillating-type machine such as the Model 406, the cutting wheel is moved horizontally back and forth *across* the cut as the wheel is fed downward. The result—greater cutting capacity, with longer wheel life.

PROPER COOLANT APPLICATION—Large reservoir and a 33 gallon/minute pump provide high volume of coolant. Unique Campbell distributor applies coolant equally to both sides of the wheel—an essential requirement for accurate cuts.

OTHER CAMPBELL MACHINES FOR ANY CUT-OFF NEED

Choose from four types of Campbell machines for wet or dry cutting—chop stroke, oscillating, horizontal or rotary—with capacities up to 14" rounds, 12" billets, plate up to 6" thick and 20 ft. long.

Regardless of your application, you'll find that a Campbell machine provides you with the best cut-off method for modern production techniques—far more efficient, accurate and economical for cutting many materials than other cutting equipment.

WRITE FOR DETAILS—Bulletin DH-260 gives the complete story on the Campbell Model 406 abrasive cutting machine. We'll also be glad to send you information on other machines; just tell us your cut-off application. And remember—your Allison-Campbell Field Engineer is an abrasive cutting specialist. Call on him for expert advice.

ACCO **CAMPBELL** ABRASIVE CUTTING **MACHINES**

TRADE MARK

Allison-Campbell Division • American Chain & Cable Company, Inc.
927 Connecticut Avenue, Bridgeport 2, Conn.

FATIGUE CRACKS

For the Athletes

We don't really know if this is a top selling point for fork trucks, but it sure will attract the attention of sports-minded purchasing agents.

Employees at a midwestern machine tool manufacturer have developed a new use for the fork lift. They've devised a regulation basketball backboard with sleeves that fit over the truck's forks. It's proved to be a great asset during lunch periods and in addition to working a full eight-hour day, the truck is in demand by the company's athletes during their off time.

TWO-POINTER: Fork truck serves as backboard for lunchtime basketball game at metalworking company.

Parked in a paved area near the plant, the unique idea lets employees sharpen up their shooting eyes while they keep their figures trim.

Enter Spacefront

Nowhere has the technological explosion boomed more loudly than in the metalworking industries. New technical advances are taking place so fast that it's almost impossible to keep up with them.

Many of these developments, born in aerospace industries, are later adopted by other metalworking companies. For example, numerical controls, once the prodigy of aircraft makers, are now spreading rapidly throughout all manufacturing. And the number of metalworking companies holding aerospace business is growing by leaps and bounds.

To keep you up to date on the latest metalworking advances in aerospace, this week (on p. 75) we introduce a new feature called Spacefront.

Here you will find news reports on aerospace contracts, new materials, manufacturing methods and engineering ideas in the metalworking sector of aircraft and missile production.

So, if your company's sights are set on aerospace, keep your eyes on Spacefront.

Expert Views

A management "expert" recently concluded that by 1965 there will be no "middle management." This group will be replaced by computers, the theory goes.

Dick (Middle Management) Groves, IRON AGE's marketing manager, got to thinking this over. His query: If middle management is wiped out, where will future top management come from? He says that if we follow this theory, the next generation of top management will have to be promoted from computers. Then, in effect, we will have computers managing computers, which in turn will control the workers.

Food for Thought

The space age has made a number of demands on the metalworking industry. Many of them have been strange and even humorous, but this week's Machine Tool column (p. 61) tells how the combination of forces in the machinery industry can work together to help develop better and faster rockets.

The old process for machining a screw-style kneader took over 35 hours. But by calling on the food and chemical machinery industry a way was devised to cut working time in more than half, meaning that U. S. missiles will be in the air sooner.

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OR SHAPE
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The Cottrell precipitators at the right of the photo remove dust and fume from waste gases at the Kaiser Fontana Plant with 99.8% efficiency. This huge new basic oxygen steel plant was designed and constructed by Kaiser Engineers.

The three Cottrells were designed and built by Research-Cottrell to clean 607,500 cubic feet of gas per minute from the oxygen furnaces. They are installed between the furnace exhaust ducts and the fans serving the three stacks seen at right below.

The high gas cleaning efficiency of this installation is obtained by means of tested and proven Cottrell design features including electrical sectionalization, Opzel collecting plates, and continuous, automatic operation of high tension rappers and M.I. plate rappers.

Research-Cottrell provides the most modern and comprehensive engineering and equipment available, based on hundreds of Cottrell installations all over the world.

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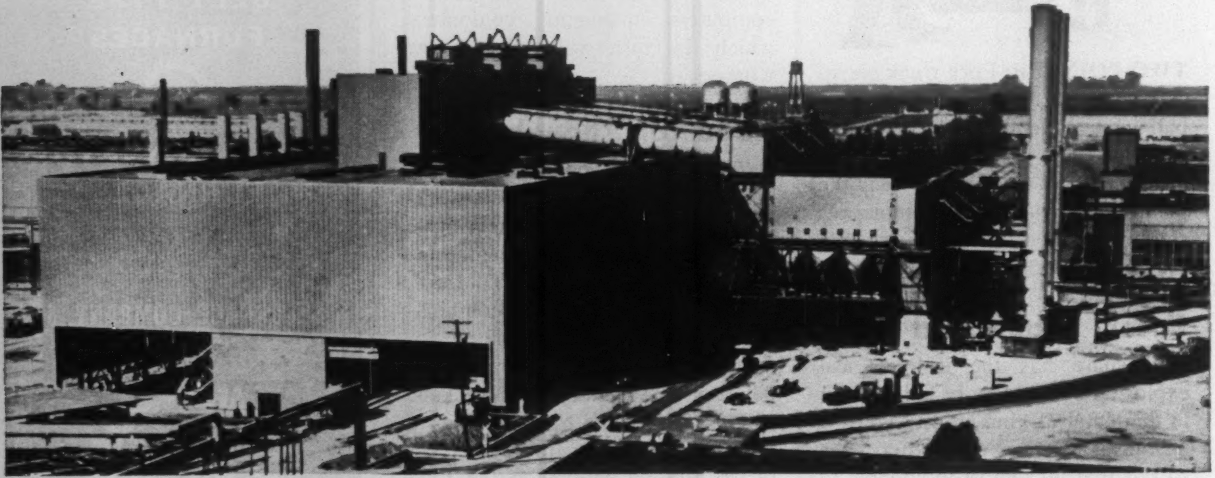

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COMING EXHIBITS

Die Casting Exposition & Congress—Nov. 8-11. Detroit Artillery, Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

Western Tool Show—Nov. 14-18, Memorial Sports Arena, Los Angeles. (American Society of Tool and Manufacturing Engineers, 10700 Puritan Ave., Detroit 38.)

Power and Mechanical Engineering Show—Nov. 28-Dec. 2, Coliseum, New York. (American Society of Mechanical Engineers, 29 W. 39th St., New York 17.)

MEETINGS

NOVEMBER

The Anti-Friction Bearing Manufacturers Assn., Inc.—Fall meeting, Nov. 3-5, Hollywood Beach Hotel, Hollywood Beach, Fla. Association headquarters, 60 E. 42nd St., New York.

Society of Plastic Engineers, Inc.—Regional technical conference on automation in injection and compression molding, Nov. 7, King Edward Sheraton Hotel, Toronto, Ontario, Canada. Society headquarters, 65 Prospect St., Stamford, Conn.

National Assn. of Secondary Material industries and the **Institute of Scrap Iron & Steel**—Joint Pacific Coast conference, Nov. 13-15, Beverly Hilton Hotel, Los Angeles. Headquarters: NASMI, 271 Madison Ave., New York 16; ISIS, 1629 H St., N. W., Washington 6, D. C.

Steel Founders' Society of America—technical and operating conference, Nov. 14-16, Hotel Carter, Cleveland. Society headquarters, Terminal Tower, Cleveland 13.

National Electric Mfrs. Assn.—Annual convention, Nov. 14-17, Hotel Traymore, Atlantic City, N. J. Association headquarters, 155 E. 44th St., New York.

Wire Assn. — Annual convention, Nov. 14-17, La Salle Hotel, Chicago. Association headquarters, 453 Main St., Stamford, Conn.

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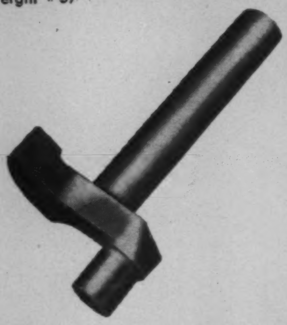
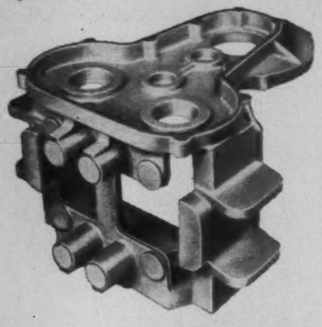


Weight #62

Weight #41



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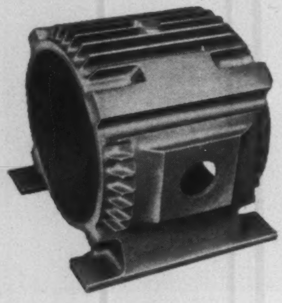

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MEETINGS

Building Research Institute — Fall conference, Nov. 15-17, Shoreham Hotel, Washington, D. C. Society headquarters, 2101 Constitution Ave., N. W., Washington 25, D. C.

Copper & Brass Research Assn.— Fall meeting, Nov. 16-17, Castle Harbour Hotel, Bermuda. Association headquarters, 420 Lexington Ave., New York 17.

National Warm Air Heating & Air Conditioning Assn.—Annual convention, Nov. 16-17, Statler-Hilton Hotel, Cleveland. Association headquarters, 145 Public Square, Cleveland.

Aircraft Industries Assn. of America — Fall meeting, Members & Board of Governors—Nov. 16-18, Phoenix, Ariz. Association headquarters, 610 Shoreham Bldg., Washington, D. C.

American Mining Congress — Coal Div. conference, Nov. 18, Penn Sheraton Hotel, Pittsburgh. Headquarters, 1200 18th St., N. W., Washington, D. C.

Fluid Controls Institute—Fall meeting, Nov. 20-22, The Drake, Chicago. Institute headquarters, P. O. Box 667, Pompano Beach, Fla.

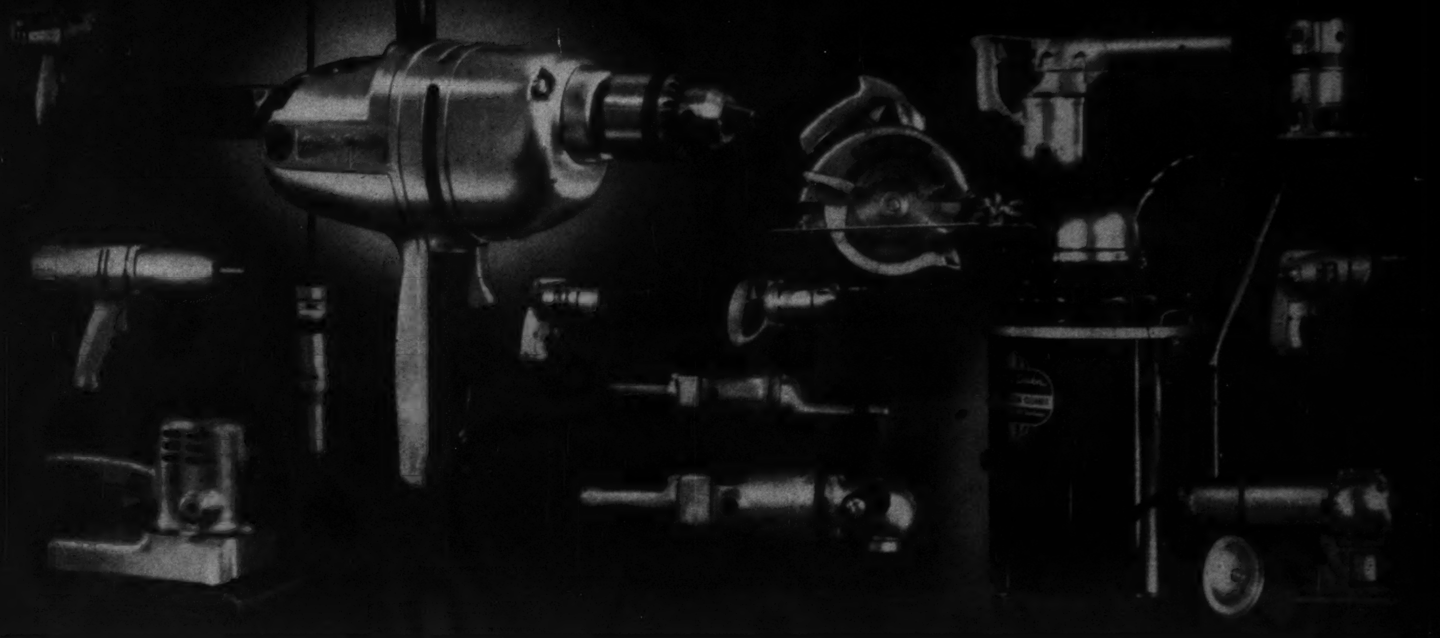
Electronic Industries Assn.—Winter conference, Nov. 29-Dec. 1, Fairmont Hotel, San Francisco. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

Iron & Steel Div., The Metallurgy Society of AIME—Annual Electric Furnace Committee conference, Nov. 30-Dec. 2, Morrison Hotel, Chicago. Society headquarters, 29 W. 39th St., New York 18, N. Y.

DECEMBER

American Institute of Chemical Engineers—Annual meeting, Dec. 4-7, Statler Hotel, Washington, D. C. Institute headquarters, 25 W. 45th St., New York.

American Mining Congress — Annual membership meeting, Dec. 5, Plaza Hotel, New York. Headquarters, 1200 18th St., N. W., Washington, D. C.



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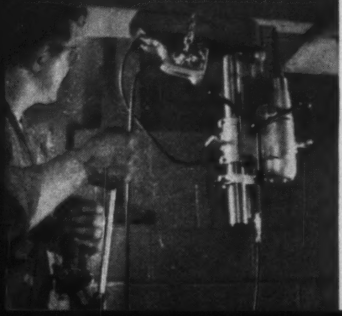
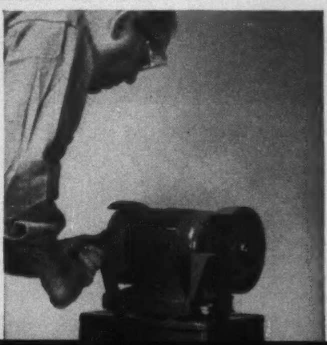


B&D 6" Std. Bench Grinder designed and built especially to handle shop grinding. Constant speed Black & Decker-built motor.



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FROM CREATIVE CRUCIBLE: HIGH SPEED STEELS THAT MAKE BETTER TOOLS POSSIBLE

TO MAKE SURE A TWIST DRILL'S CUTTING EDGES ARE SHARP AND CLEAN, an inspector measures its chisel angle, point angle and lip relief under the powerful lens of a precision instrument. Continually-improved Rex High Speed Steels help produce the fine edges so essential in twist drills.

MORE HOLES PER DRILL *Today's twist drills meet new standards for hardness, toughness and strength— because of continually improved Rex® High Speed Steels.*

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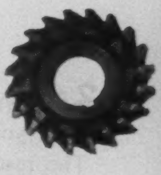
For complete information on how Rex High Speed Steels can help make precision tools better, call or write the Crucible branch office or service center near you.

TWIST DRILLS made of Rex High Speed Steels consistently meet the drillmakers' exacting tests for hardness.

BETTER TOOLS, THROUGH BETTER STEELS. Constant improvement of Rex High Speed Steels ensures the increasingly better performance of hobs, taps, broaches and cutters — as well as twist drills.



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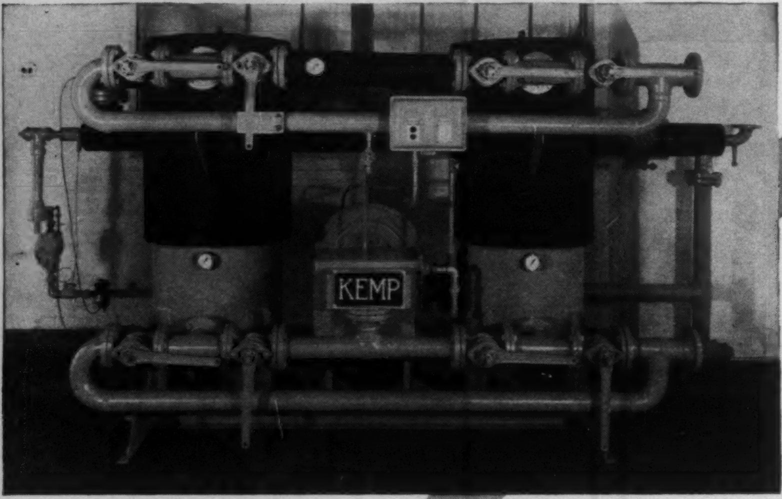

1 Full Reactivation . . . assures unmatched drying power for air, gases or liquids. Exclusive external design allows complete reactivation unaffected by variations in flow rate or dry gas needs.

2 Low Pressure Loss . . . is another Kemp Convection Dryer cost-saving feature. Unique full-flow design of drying towers and connections assures the least pressure loss, lower operating cost.

3 Automatic Control . . . is achieved once you pre-set the program timer. The reactivation cycle of heating and cooling then becomes automatic. All Kemp Dryers are easily switched to manual control, too.

4 Safety-proved Operation . . . is a fact with any Kemp Dryer. Check and relief valves, an alarm circuit . . . all protect the entire system. Write for Bulletin D-106 for further details . . . or contact your local Kemp Representative.

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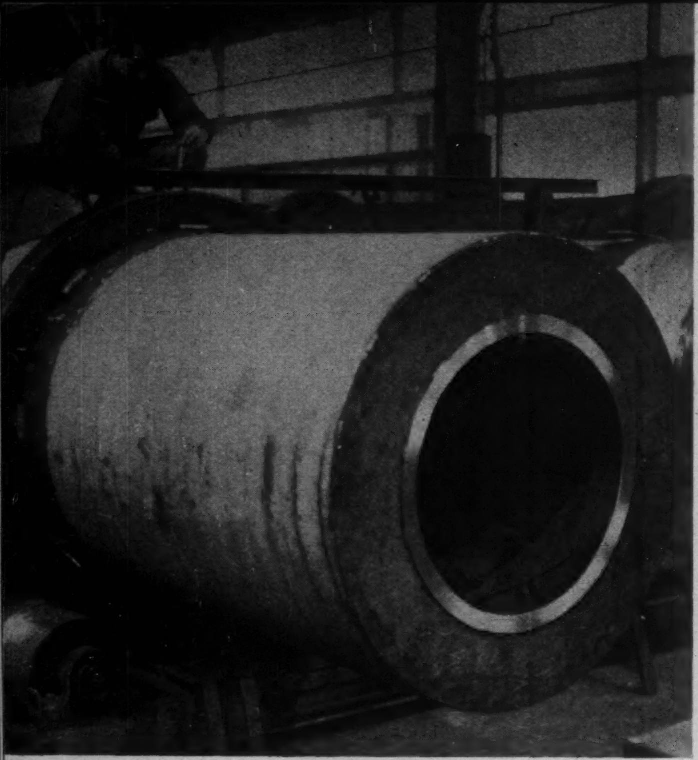

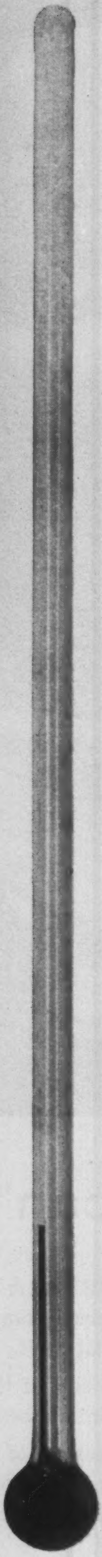

...HOT

Temperature in this stainless steel rotary salt dryer will be 1600°F from combustion gases. It's used to demoisturize salt, one step in making high octane gas. C. O. Bartlett & Snow was the fabricator. They chose stainless steel because of its outstanding high temperature strength and resistance to high temperature oxidation.

COLD...

—443°F is only 16.4 degrees above absolute zero. That's one reason stainless steel is used in this heat transfer unit that helps simulate outer space conditions of near absolute zero temperature and one-billionth of an atmosphere. The all-stainless unit is named "PLATE-COIL," manufactured by Tranter Manufacturing, Inc., Lansing, Michigan.

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This mark tells you a product is made of modern, dependable Steel.

...and in between

No material can match stainless steel's versatility. Stainless steel offers designers and fabricators a unique combination of properties: superior strength, extraordinary corrosion resistance to an enormous variety of reagents, outstanding high temperature properties, and appearance. It is easily fabricated and, because stainless steel lasts longer, actually costs less in the long run. If you have a selection or delivery problem, ask your USS representative or nearest steel service center.

USS is a registered trademark

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Columbia-Geneva Steel — San Francisco
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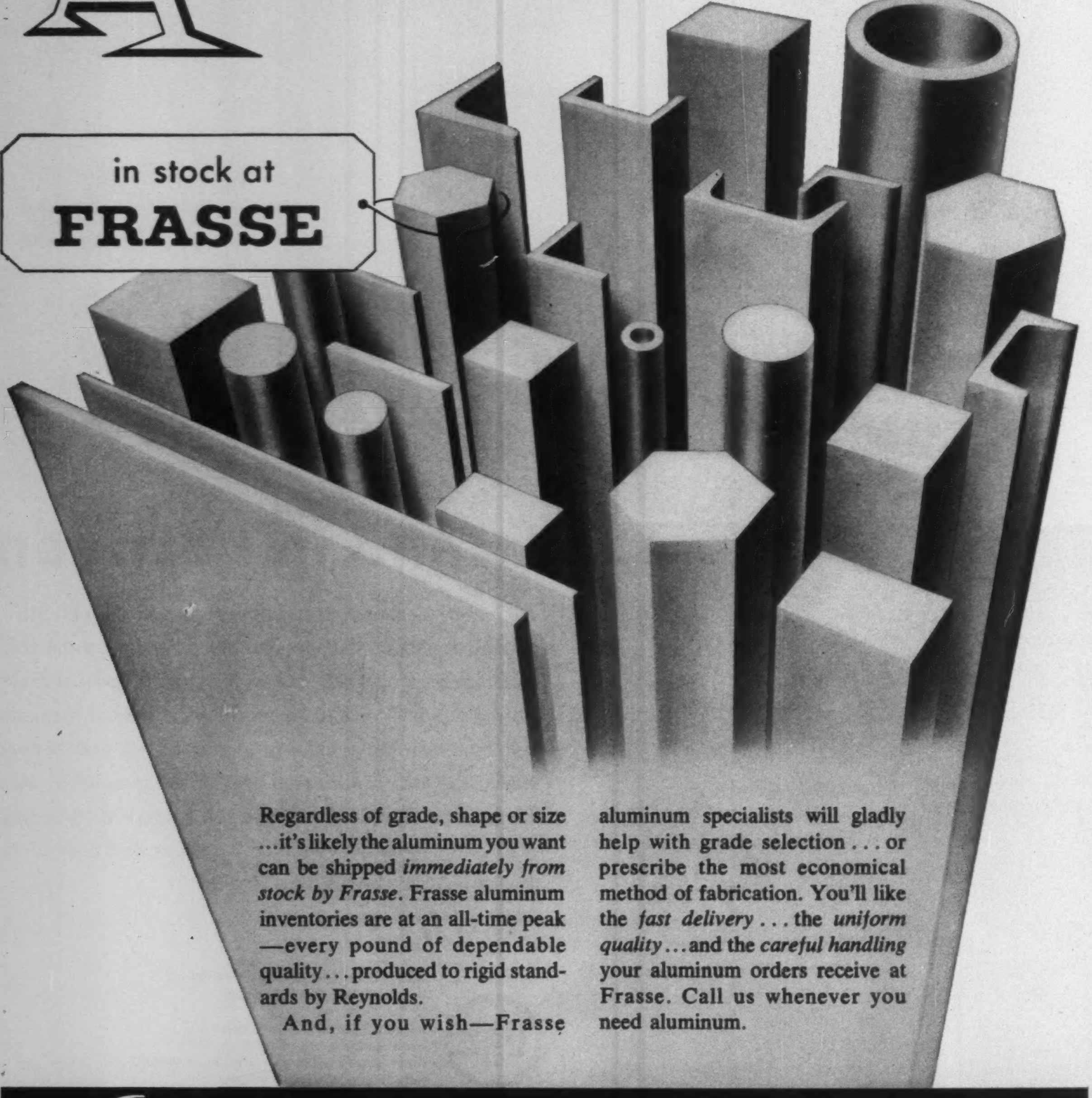

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TMW's facilities and 65 years' experience in precision (tolerance to 10ths) manufacturing is available to you *now*, on a short or long-term basis. For more details, or for new Facilities File Folder, call or write: Textile Machine Works, Contract Division, Reading, Penna.

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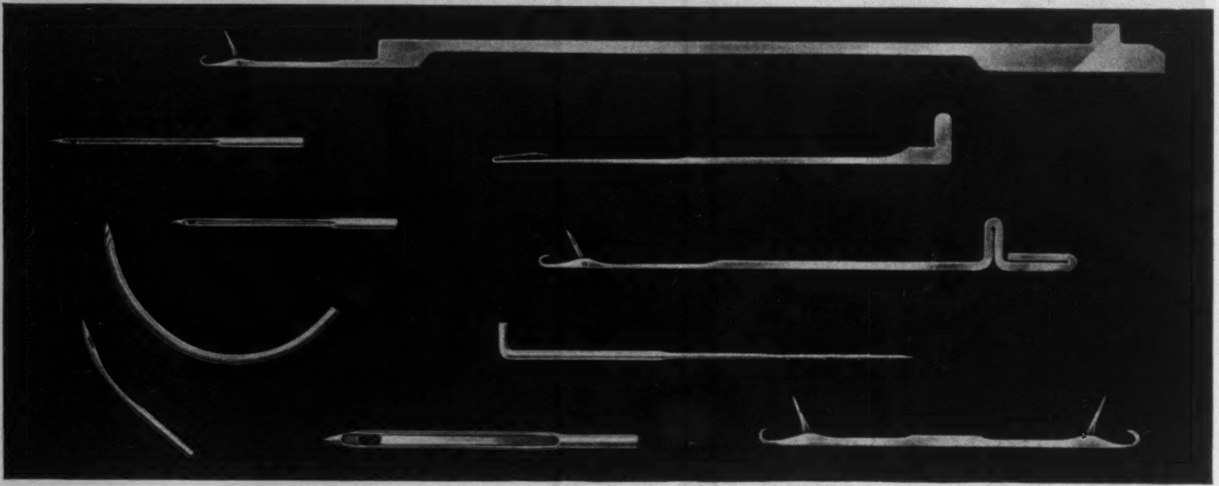
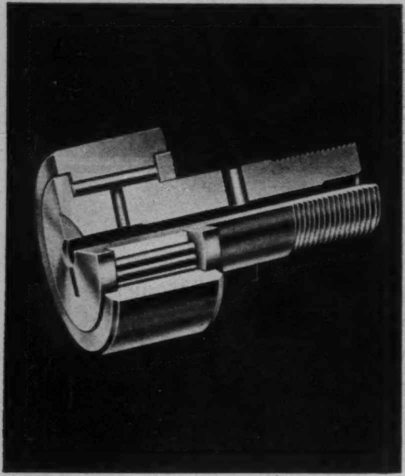
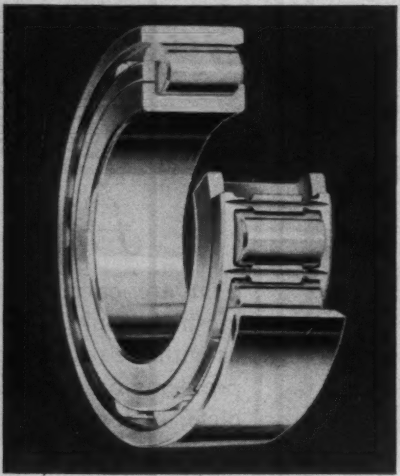


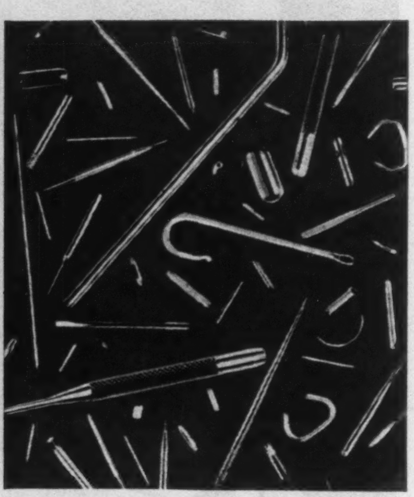
BUT THIS, TOO, IS TORRINGTON...



Outstanding maker of needle roller cam followers built to withstand heavy loads in aircraft, textile machinery and other equipment.



Precision manufacturer of radial roller bearings used for such heavy duty applications as steel rolling mill and oil field equipment.



Foremost producer of small precision metal parts, manufactured by the millions for use in countless industrial and consumer products.

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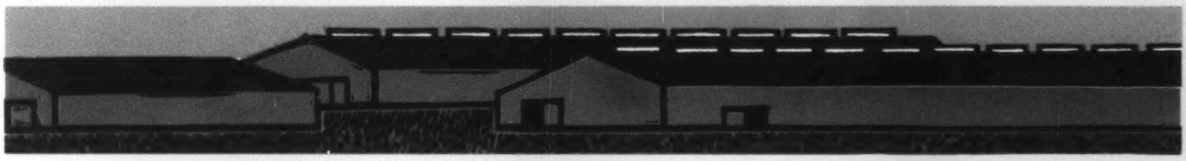
STEEL

RISING FAST IN MID-AMERICA— MIDWEST STEEL CORPORATION



Above, with the big "M" in it, you see the trademark of Midwest Steel Corporation, a new division of National Steel Corporation, now nearing completion in the heart of the metalworking industry of Mid-America.

It stands for a new, ultra-modern flat-rolled products plant—the most efficient and advanced in the country—soon to swing into operation on the Indiana shore of Lake Michigan.

It stands for a new look in steel plants, for handsome, green buildings and grounds . . . clean and well cared for.

It stands for new standards in steel products and for the finest steels: electrolytic tin plate, galvanized coils and sheets, hot- and cold-rolled sheets.

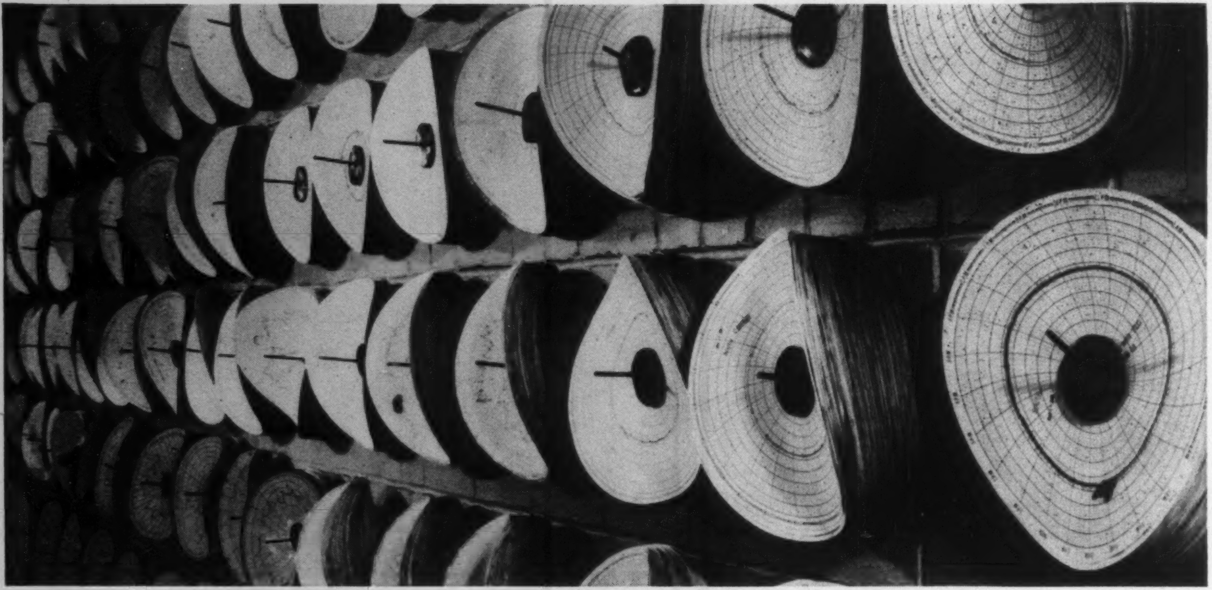
It stands for outstanding service, for new and economical solutions to your problems, for expert assistance whenever you need it.

It stands for a direct pipeline from our door to yours via waterways, railroads and highways.

Early in 1961, we'll be ready to roll. And the vast metalworking area ringing Chicago will have a new supply of quality steel on its doorstep. Midwest Steel will be in business, producing more muscle for Mid-America.

MIDWEST STEEL
Portage, Indiana

Midwest Steel is a division of **NATIONAL STEEL CORPORATION**



90 of these charts on a single sheet —digitized

Corporate management emphasis on (1) efficient manpower utilization and (2) maximum process productivity has led to the large-scale use of industrial centralized control. Today, the accumulation of data on process variables can also be centralized with consequent gains in economics and efficiency.

The Kybernetes Series 2000 is an all electronic (solid state) data processing system for the accumulation of all kinds of process data. Designed for flexibility of application, the Series 2000 has the reliability required by industrial operations. A unique analog to digital conversion system provides accurate digitizing of process variables regardless of source (pneumatic, electric, electronic) so that each variable is typed on a sheet of paper with up to 90 columns of 3-digit figures.

These are some of the reasons why the Hagan Kybernetes system is finding acceptance in industry:

- May be used for research as well as for operational records.
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- Kybernetes is the only data processing equipment on the market that provides uninterrupted alarm scanning.
- High accuracy with easy re-programming. Kybernetes systems provide easy change of any input, or its range. The system is so designed that spare parts stocking is minimum, and the system may be expanded to add additional inputs, or additional functions.

A Hagan engineer will be glad to explain the many labor-saving and unique advantages of the Kybernetes Series 2000 Data Processing system. Or write for Bulletin MSP 161.

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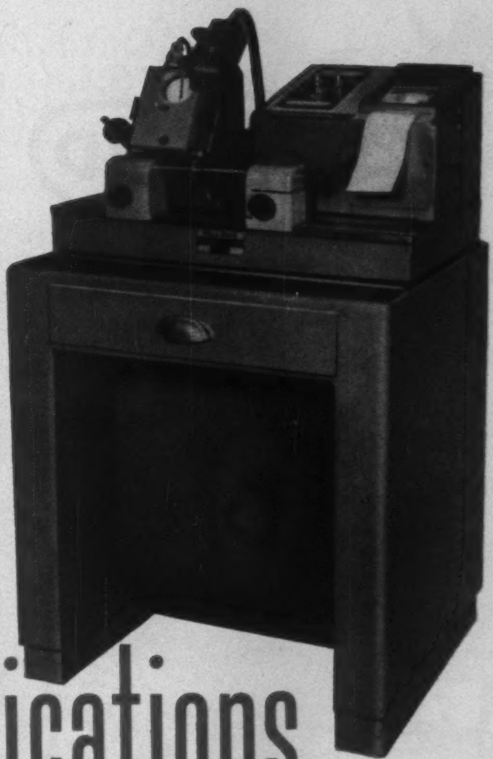
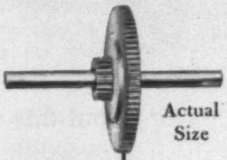
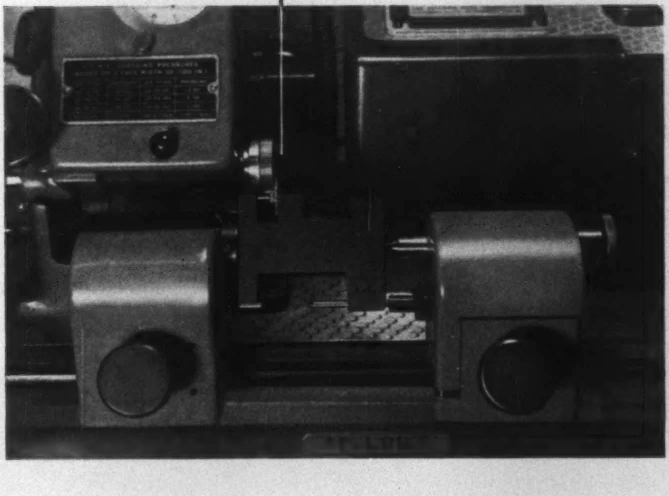


now you can check and record fine-pitch gear accuracy


Actual Size

at 1600 magnifications

on the No. 4 Fellows Red Liner



Now, the No. 4 Red Liner makes "composite" checks on the finest instrument gears with unbelievable accuracy and sensitivity. 1600 to 1 magnifications are obtained with the electrical recording system which gives a written, unbiased record for instant reading or for proof-of-accuracy files.

One report states — "11 teeth, 200 D. P. pinion backed up to a 100 tooth gear on a cluster, checked easily on the No. 4 Red Liner."

The job shown is 96 pitch with 22 teeth on the small gear and 80 teeth on the larger gear. The pinion shaft rides in vees in a turret-type fixture.

Fellows inspection units cover a range from the tiniest instrument gear up to some that are 24 inches in diameter.

THE FELLOWS GEAR SHAPER COMPANY 78 River Street, Springfield, Vermont, U.S.A.

Branch Offices: 1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N.J.
5835 West North Avenue, Chicago 39
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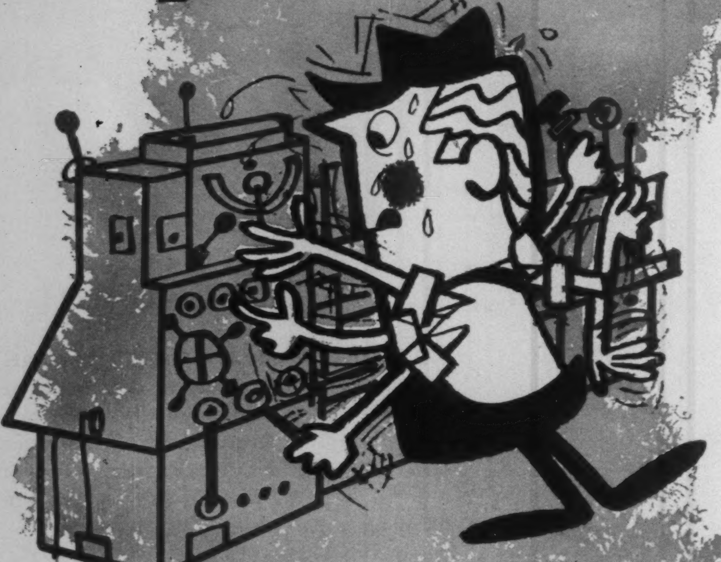
THE PRECISION LINE Fellows *Gear Production Equipment*

STOP

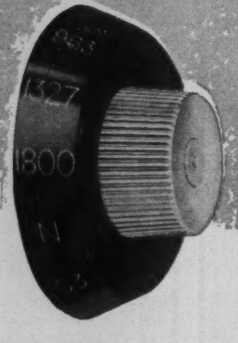
these men from stealing your profits. . . . . .

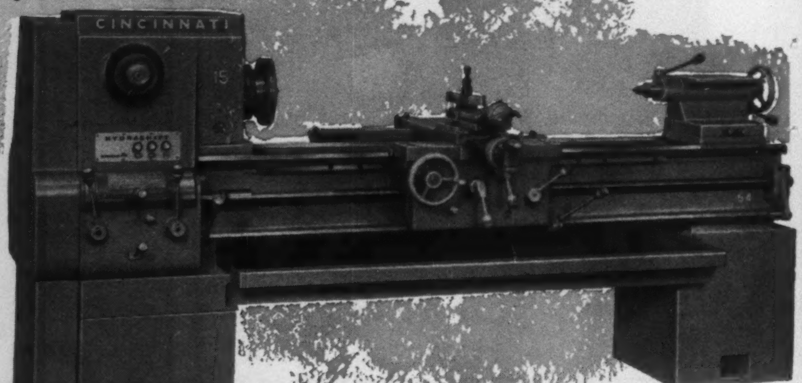
You know about this fellow . . . he's stealing "cash", and you do try to stop him.



But **YOU** cause this theft . . .
you force this man to
steal your profits . . .
make him add to labor and burden costs on most lathe jobs, no matter how hard he works.

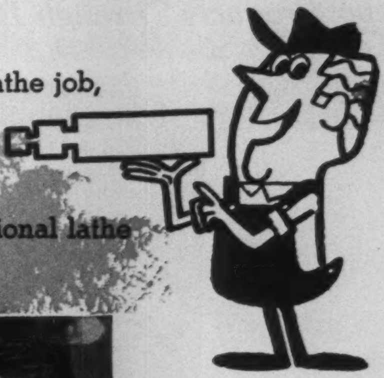
The solution is easy:
make your operator a *cost-reducer* on ALL of his lathe jobs—shift him to HYDRASHIFT* Here's why . . . .





HYDRASHIFT is Cincinnati's new lathe line with *the new way to change spindle speeds . . . hydraulically!

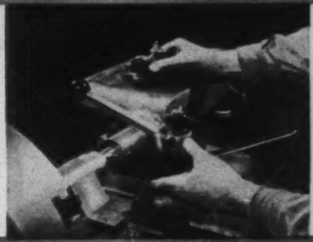
Compare the machining of this typical lathe job,
two steps
and two necks
on the new HYDRASHIFT . . . on a conventional lathe



As second step is being cut, operator turns the dial to speed required for the necking cut.

Operator waits for machine to complete the step cuts.

Step cuts completed, operator changes to necking tool (he had it lying on the convenient Tray-Top) and positions tool for cut.



Step cuts completed, operator changes to necking tool and positions tool for cut.

Operator engages spindle lever and cuts the neck—*without leaving apron.*

Operator goes to headstock, shifts various levers to change to spindle speed for necking cut.

Necking cuts completed, operator changes tools for next workpiece.

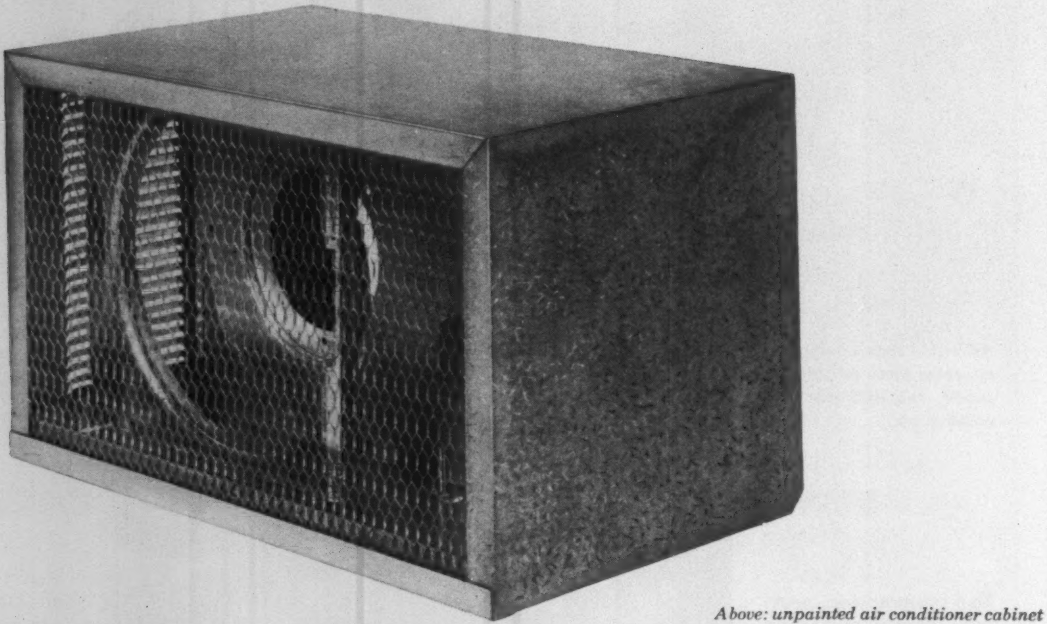
Operator returns to apron, engages spindle lever, and cuts the neck.

Don't force your lathe operators to steal profits from your pockets—take a look at the new Cincinnati HYDRASHIFT Lathes at your nearby Cincinnati Lathe and Tool Dealer's showroom. If you can't reach him immediately, wire collect!

CINCINNATI LATHE AND TOOL CO. CINCINNATI 9, OHIO

HYDRASHIFT Lathes/CINCINNATI Drilling Machines/SPIROPOINT Drill Sharpeners

Better Products Through Better Methods and Steels



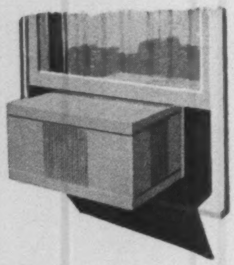
Above: unpainted air conditioner cabinet

How modern zinc-coated steel sheets keep air conditioners weatherproof—season after season after season.

When cold-rolled sheet steel formed the cabinets and special drawn base pans of air conditioners, they were primed and painted inside and out to protect them from constant exposure and functional moisture. Even so, corrosion often took hold around fastenings, louver edges and scratches.

Now that Weirkote continuous-process zinc-coated steel is used, the cabinet, louvers and chassis can be cut, bent and formed (even worked to the limits of the steel itself) without chipping or flaking the corrosion resistant zinc surface. When the outside paint finish is applied (primarily for decoration) the air conditioner has the double protection of a coating of paint and a coating of zinc assuring corrosion-free service for many years to come.

It's because of this weather-shedding surface, this superior formability that continuous-process zinc-coated steel is more and more the metal specified for air conditioning, heating and ventilating equipment.



A major supplier: Weirton Steel Company—producer of Weirkote continuous-process zinc-coated steel and many other steels that improve products, methods and profits throughout industry.

Galvanized Steel

Look for the STEELMARK on the products you buy; place it on the products you sell.

WEIRTON STEEL
Weirton, West Virginia

WEIRTON STEEL COMPANY

Weirton Steel is a division of **NATIONAL STEEL CORPORATION**
Weirkote will also be available in 1961 from National's Midwest Steel Division, Portage, Indiana

MARKETERS OF CONSUMER DURABLE GOODS are facing increased competition in their chase for the discretionary income dollar. Brand competition is still tough, but what is really hurting is the competition from European trips, boats, built-in hi-fi and the like. Recreation spending has swelled to $41 billion.

COMPACTS CONTINUE CLIMB as production hit 47,200 units for the third week in October. This was 32 pct of U. S. auto production. By units and share of market this is a record for compacts.

THE TOTAL MARKET IN FOREIGN COUNTRIES for imported goods is in excess of $85 billion. This is the word of U. S. Commerce Dept. official, Bradley Fisk. He foresees the market expanding by another $15 billion in the next five years. Says Mr. Fisk: "U. S. businessmen might expect to get about a fifth of this market."

NET NEW ORDERS FOR MACHINE TOOLS showed mixed signs in September. Cutting-type tool orders dropped from $47,800,000 in August to $42,450,000 in September. Forming type tools hit $9,900,000 up $850,000 over August. Tool builders feel the effects of their exposition will not be felt for several months yet.

AGGRESSIVE MARKETING TACTICS BY CHINESE have put them in the thick of the trade war, according to Michigan U's Prof. Leland Stowe. He says China's trade terms and methods include: No standard prices, easy payment terms, use of dumping, barter deals, reliable deliveries, and success at international fairs.

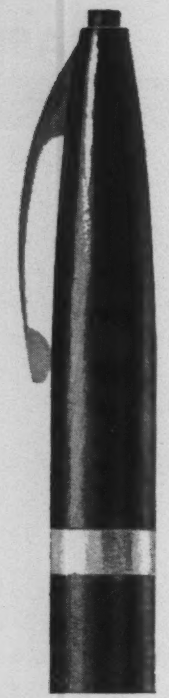
HOME LAUNDRY APPLIANCE SALES JUMPED in September over August by 30 pct. Allowing for the seasonal factor, this jump is still a bright note. Gas clothes dryers showed a 67 pct gain, electric dryers a 52 pct gain, and combination washer-dryers were up 46 pct.

THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows a 22.6 pct decrease in September from August. The September index was 197.9 (1947-49=100) for new bookings. This is below the 1959 average of 234.7. The index of shipments rose in September to 223.5, up from 217.3 in August.

SHIPMENTS OF IRON AND STEEL CASTINGS in July were 25 pct below the June total, and 15 pct below shipments in July 1959. Production of steel ingots in July was 6.3 million tons, down 15 pct from June.

ON THE BALL
500,000
TIMES A DAY
BRIDGEPORT
Free-Machining
Brass Rod!

Because ball point pens are in everyday use, production of vital brass tips becomes astronomical along with quality control problems.



These tips — one of which is shown much enlarged — are produced at ultra-high speeds. The brass rod needed for them must be flawless in every respect. *Consistent* metallurgical composition, *precise* dimensional tolerances and *unvarying* standards of machinability — if any of these qualities vary even a fraction, production comes to a frequent and costly halt.

That's why Revere Metal Art Co., Inc., New York City, specifies Bridgeport Free-Machining Ball Point Pen Brass Rod for these inserts. It meets all requirements for precision, straightness, workability, machinability and tolerances —and, in addition, provides a surface finish that keeps finishing time and costs to a minimum.

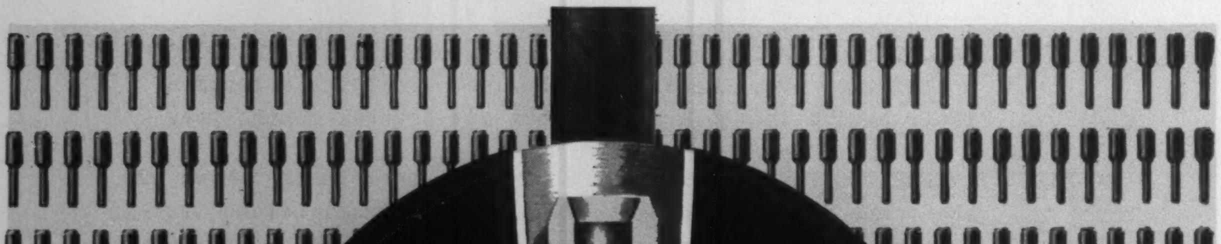
Whether you use rod, strip or tube, you can count—just as Revere does—on getting consistent quality every time you specify Bridgeport Brass Alloys. It will pay you to get the complete story. Call your nearest Bridgeport Sales Office or write us direct for a complete list of Bridgeport products — Dept. 3411.

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY

BRIDGEPORT 2, CONNECTICUT

Specialists in Metals from Aluminum to Zirconium



Bridgeport Free-Machining Brass Rod tip, shown enlarged

Construction Equipment Makers Boost Overseas Sites, Sales

Domestic and export sales of construction equipment are lagging. But that's only part of the story.

Manufacturers are beefing up foreign operations at an unprecedented pace.

—By K. W. Bennett.

THE BIG MOVE: Manufacturers of construction equipment, such as this shovel crane, note a total sales increase. The real action comes, however, from foreign-based operations which are expanding rapidly.

▪ The construction equipment man you see studying a travel folder isn't going on vacation. He's probably planning a new foreign plant site.

In a fast stepping exodus that has government officials more than mildly worried, U. S. construction equipment makers are beefing foreign operations at an unprecedented pace. At least five major equipment builders are shopping for foreign plants. And there are reports that at least one will close two U. S.-based plants.

Regarding another, a union official commented grimly last week, "I just came from a meeting with the company. We figure it's employing as many men overseas as it is in the U. S."

It's U. S. Competition — While U. S. goods may suffer in many overseas markets, construction equipment men who are already sited on foreign shores complain the only competitors who have them really worried are other American companies. At least 85 construction equipment plants are in operation abroad, under American ownership, or as licensees of U. S. companies.

At least two fairly large foreign companies gave up the ghost recently. One is going out of business. The other is selling out to a U. S. manufacturer. No less than 10 major U. S. producers report foreign sales are 25-50 pct of total sales. Most say their overseas sales are at record levels.

Reluctant to Report — Construction equipment makers are reluctant to report what percentage of their export sales were built overseas. In the case of Caterpillar Tractor Co., biggest of the earthmovers, foreign sales averaged 44.9 pct of total company sales through first half 1960; moved to 49 pct in the third quarter.

On this basis, the export sales of this single company will exceed government estimates of U. S.-made equipment that will be shipped to foreign buyers this year. This should be a clue to the rapid growth of overseas manufacturing by equipment producers.

Dept. of Commerce believes that only $350 million worth of machines will be shipped abroad this year.

It's reasonable to assume that overseas manufacturing will exceed, easily, 20 pct of total U. S. domestic output at the close of 1960.

Strong Foreign Markets—Foreign markets are strong, while business here continues slow. International-Harvester Co., Allis-Chalmers Mfg. Co. and Caterpillar Tractor all indicate that inventories of finished goods are at satisfactory levels.

Nonetheless, other estimates

range from three to five months, if dealer inventories are included. Government sources indicate inventories in July ran at $500 million in new equipment and at least $200 million in used equipment.

One company entered the 1960 selling season with a nine month inventory carryover. Early 1961 forecasts outline no domestic sales gains; more likely a mild drop.

Veteran sellers say it's wise to enter a selling season with three months inventory and that this is normal. But construction equipment marketing men admit that this three months inventory should be well under that figure when the domestic selling season ends in October. The three month reserve is usually built up over the winter months for next year's spring sales.

A Domestic Cutback? — Strong finished goods inventories and the continuing gain in foreign output, suggest a cutback in domestic operations over the winter months. Marketers say the area most affected will be the Midwest. With an estimated 630 builders of construction equipment in the U. S., 85 pct of the output comes from seven Midwestern states.

What happened to the "Soaring Sixties?" Construction men point out that heavy construction contracts hit record levels this year. Fabricators report business is 13 pct over last year. But earthmoving, in the domestic market, is standing still.

One reason for the downward movement, according to a marketing director for a major producer: A surplus of available used machines. Bankruptcies, and sales of government surplus have also been high.

Other Reasons—A second important reason is that the highway program is still pretty much a program. Despite letting of an additional $2 billion in contracts in the third quarter, only $450 million has been spent. $4 billion was let in 1959. Some states have difficulty in matching federal grants, and are already behind on highway contract payments.

A third factor that will have to be watched: Importers are bringing pressure on federal agencies to allow import of more used machines.

Then, too, the contractor is in a cost squeeze. Each new purchase is made only when necessary, and often equipment is leased to avoid capital outlay. One distributor reports that his new equipment sales are low and sinking, but that his parts business has quadrupled.

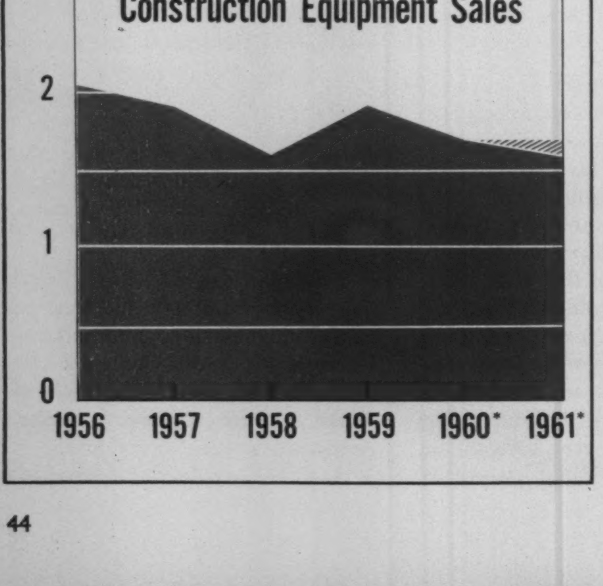
At the Plateau—The 1960 downtrend, in the face of good building levels, has market men commenting that earthmoving may finally have hit a long predicted plateau, after the expected sales peak of 1959 (IA—Feb. 12, '59).

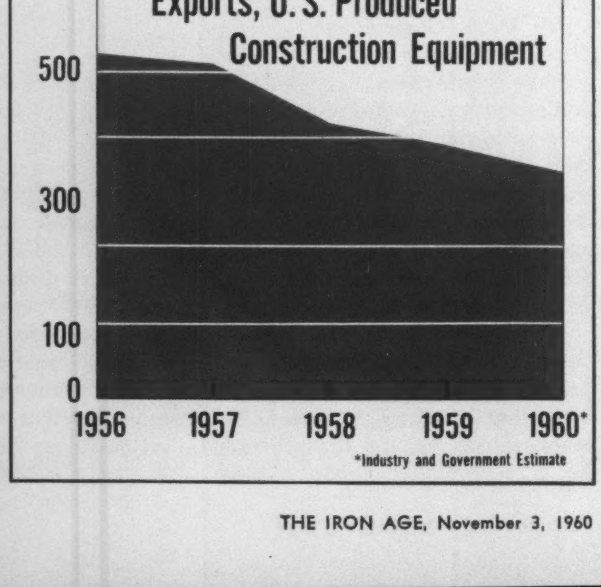
From a (constant dollar) growth rate of 4 to 5 pct in the 1950's, the industry may be moving back to a 1 to 2 pct growth rate until at least 1965. Meantime, foreign operations are expected to expand at double the domestic rate.

In an effort to nudge the domestic market, construction equipment makers are pushing research and development. In a marketing switch, Bucyrus-Erie Corp. is developing a German idea on U. S. lines; will market the first U. S. built "tower crane" with a 150 ft tower. Euclid and Allis-Chalmers are announcing "light-heavyweight" tractors—small equipment with boosted power output—that could sell in the industrial, construction, or even agricultural fields.

Koehring Co. will introduce an all-hydraulic crawler mounted load-

U.S. Equipment Sales and Exports Decline





er, with a 360° swing, for high speed work in close quarters.

Frankly Optimistic—A sales vice president told The IRON AGE, "For an industry that's working at not much over 50 pct capacity, we're frankly optimistic. Imports of foreign equipment aren't a problem. It amounts to $30 million per year, but it's mainly components. I think we're out-designing our foreign competition. With foreign manufacturer licensing, we can lick them.

"Our problem now is to breathe life into this domestic market."

Not all manufacturers will dismiss foreign competition that lightly. The U. S. manufacturer, fighting for export sales with equipment produced here, must buck easier foreign financing, lower selling prices, tariffs, freight costs, discrimination, and offbeat foreign specifications.

On the credit side: Foreign operations are already paying returns. Those that build increasing portions of their equipment overseas, in the market in which it will be sold, report profits are recovering. Caterpillar, in its third quarter report, finds sales down, but profits advanced from 5.7 pct to 6.7 pct. The company credits this to "adjusting expenditures and employment to a sales level lower than expected earlier this year," yet it seems more than coincidence that the gain came in a quarter when export sales, and therefore overseas manufacturing operations, were at record levels.

Looking Ahead—The construction equipment industry will continue to expand and to modernize. But it is a market that must be watched with increasing care. Increased foreign profits suggest more expansion abroad. Capital dollars, heretofore earmarked for expenditure at home, must be stretched to cover additional plans abroad.

The steady decline in consumption of materials at home (currently less than half the rate of record levels) and shrinking employment are some results.

Some major companies that as yet do not manufacture abroad are now considering extending their operations overseas.

Is Investing Abroad A Trend in Steel?

Two recent moves by U. S. producers raise the question of more investment abroad for steelmaking.

It's not likely to be a major trend, but the moves underscore the concept of a world market.

▪ The fact that—within a month of each other—two U. S. specialty steel producers have announced joint ventures with European companies suggests that steel may follow the trend of U. S. industries abroad.

So far, the moves have been on a small scale: Crucible Steel Co. of America will put some $2.4 million into an Italian venture; Allegheny Ludlum's Belgian investment is now pegged at about $5 million. (IA Sept. 29, Oct. 27, p. 13.)

No Surge—Also, they represent a minor part of U. S. overseas investment. The Commerce Dept. estimates that U. S. companies will invest $3.9 billion abroad this year. This would be a bit better than last year's $3.7 billion, but nowhere near 1957's record $4.8 billion.

The significance appears to lie in the switch from licensing agreements to joint ventures. Other industries have found that licensing had its advantages in small markets where the licensee knew his field very well; but where the market becomes large and diverse, the joint venture seems the better approach.

A World-Wide Problem—U. S. Steel "has no foreign move under contemplation," said Roger M. Blough, U. S. Steel's board chairman. But he added that "steel marketing problems are now world-wide. I am aware of one thing," he continued, "It is absolutely necessary to remain competitive. If that means some companies have to operate abroad, it is natural that they do."

In Their Faces—American steel companies have been criticized for failing to develop new iron and steelmaking processes. Austrian, German, Swedish, and Russian advances have been thrown in their faces. But in many areas, the steel industry of the United States leads the world.

The steel industry of the United States has undoubtedly put more money into research on rolling than the rest of the world combined.

Lots of Licenses—As a result, the files of the steel mills of Europe are dotted with license and know-how agreements involving techniques developed in the United States. They cover stainless and electrical sheet production, tinplate and galvanizing lines, melting and rolling of special alloys.

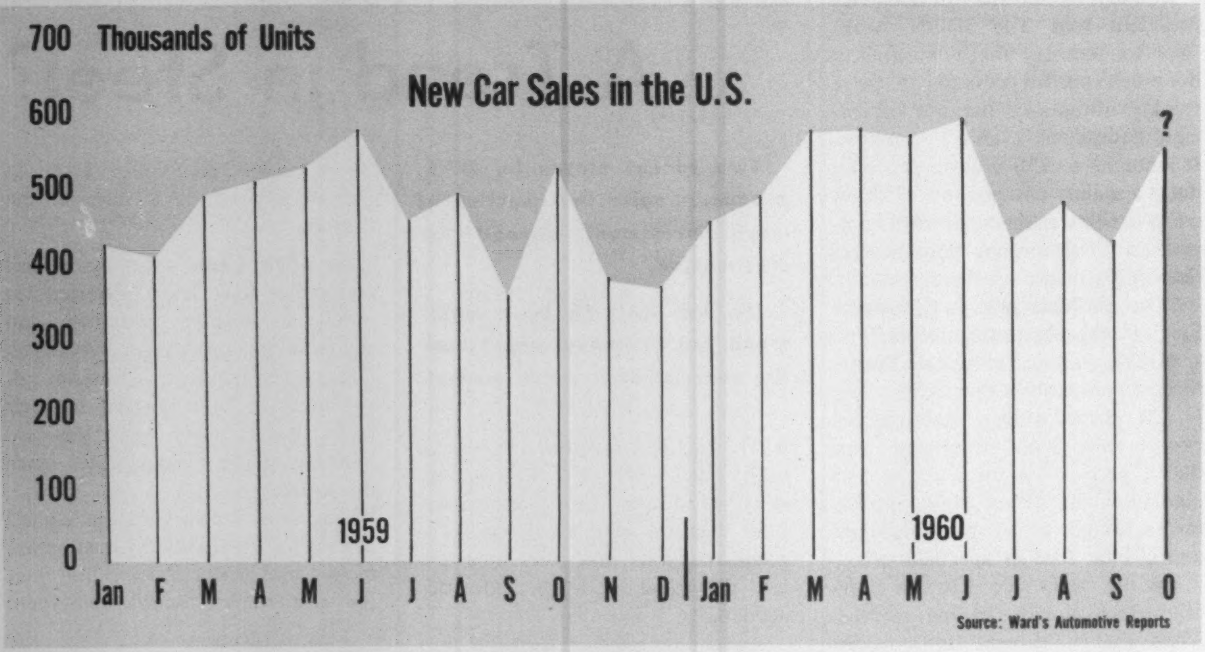
Flat-rolled steel, for consumer goods, is the area most likely to boom if the Common Market comes along as its backers expect. This is where the American mill has an edge on know-how.

Why Not?—Is it possible, then, that U. S. mills will consider large scale operations in Europe? This would merely follow the path blazed by other major U. S. industries.

At the moment this seems quite unlikely, mainly because of the enormous cost involved. And it is not at all likely to happen if U. S. mills can hold costs in line while overseas wage rates rise with living standards.

But this is certain: Managements of U. S. companies are watching developments abroad as they never have before. And they are not going to lie down and be figuratively rolled through the very mills they helped to develop.—**G. F. Sullivan.**

How Car Sales Went This Year and Last



Source: Ward's Automotive Reports

Can Auto Sales Hold the Pace?

Last month, sales of new U. S. cars may have set an all-time record for October.

But with dealers' lots full, sales for 1960 may have trouble reaching the 6.5 million predicted.—By A. E. Fleming.

▪ October sales of new U. S. cars were given every chance last week of setting an all-time high for the month of October. Barring a relapse in the last 10 days of the month, the total looked like it might pass the record 527,000 scored in October last year.

In any other year this would be great news—a record-setting send-off to the fourth quarter of the year. This year the joy is tainted by a huge inventory of new cars which dipped briefly below the one million level in August and September but is now edging toward that figure once again.

Crowded Lots — As August started there were 1,060,000 new unsold cars of U. S.-make in dealer lots around the country. Plant close-downs for model changeover reduced the count to 890,000 as September got underway.

By the start of October the total stood at 865,000, greatest amount of unsold new cars ever on hand as a fresh selling season began. The 865,000 stockpile broke down into 450,000 1961 models and 415,000 1960's. It was the pile of 1960's that was causing the most concern.

At October's selling rates there was reason to believe it might be the end of November before dealers could get rid of the 1960 models.

Sell at Any Price—It was the way dealers were getting rid of them that caused alarm in at least one area of the trade. Viewing the situation with less than optimism, B. L. Williams, president of the National Automobile Dealers Assn., says the nation's dealers have been selling 1960's this fall for whatever they can get.

Every 1960 sold on this basis, he figures, means one less 1961 model will be sold and with the large pile of 1960's on hand the amount is considerable. Mr. Williams says he doesn't see how 1961 model sales will go over 5.8 million.

Scheduling Downward—Throughout the new model introduction season, automakers have been forecasting a 1961 sale of around 6.5 million U. S. cars.

So they scheduled 1.9 million cars for the fourth quarter of 1960, beginning with a schedule of 685,000 in October. As October progressed, schedules were pared to 660,000, then to 630,000. The final figure was closer to 615,000.

Although production is now apparently aimed at a 1.6 million level in the fourth quarter, expectations are sales will hit 1.5 million.

Welded Tubes Gain New Markets

Improved Product at Lower Cost Cuts into Seamless Sales

Cold-drawn welded tubing is taking over markets formerly held by seamless products.

New processing techniques permit larger sizes than in the past.—By G. J. McManus.

▪ Technical and market developments may soon change a trend into a stampede for makers of carbon steel tubing.

Producers, distributors and users are all joining in a swing to cold-drawn welded tubing. After years of picking away at the market, the welded product now seems ready to take charge.

Year of Progress—Here's what's happened in the past year:

1. New processing techniques have enabled producers to double the size range of cold-drawn welded tubing.
2. New acceptance by key distributors is paving the way for use of welded tubing in general mechanical applications.
3. New headway is reported by mills in their push to sell users on the merits of cold-drawn electricweld.

Cost and Quality—Behind this progress, say producers, are cost and quality factors. Cold-drawn electricweld competes in most applications with cold-drawn seamless. According to Jones & Laughlin Steel Corp., the welded tubing sells for 5 to 20 pct less than seamless in diameters up to 4.5 in.

Quality advantages turn on the fact that electricweld tubing is made from rolled strip. Mills start with stock that has been thoroughly worked and held to close gage tolerances. These qualities show up in the finish and regularity of the welded tubing. The quality edge carries through subsequent cold drawing.

For users, this edge has meant less finishing work along with a lower buying price.

Gaining Markets—This kind of experience has enabled cold-drawn electricweld to gain a growing share of the mechanical tubing market. Cylinder tubing for hydraulic jacks, farm equipment hoists and similar applications has probably been the biggest single growth area. Auto companies have approved specifications for hydraulic line tubing.

Over the past year, warehouses have begun to take on electricweld as a stock item for general mechanical tubing uses. One big distributor on the West Coast has moved in this direction. Several eastern service centers are following.

Producers Agree—Among producers, there seems to be general agreement that electricweld is moving up. Pittsburgh Steel Co., which has made only seamless tubing in the past, is now buying electricweld and cold-drawing it. National Tube Div. of U. S. Steel Corp. is said to be considering new electricweld capacity for Gary.

Moreover, producers are moving to raise the size limits of cold-drawn electricweld. Until recently, cold drawers were limited by the fact that most electricweld tubing mills only go up to 5 in. dia. After cold reduction, maximum diameter was around 4.5 in.

Large Sizes—About a year ago, Pacific Tube Co. of Los Angeles began work on the cold drawing of electricweld pipe. Pipe is made in larger sizes than tubing. Cold drawing of these large sizes has been successful enough to bring general activity. In spot tests, National Tube has produced cold-drawn electricweld of 8 in. diam.

With Republic Steel Corp. in the forefront, producers have worked hard to assure quality and gain acceptance. The development of non-destructive tests and the lavish application of these have helped in establishing high standards.

Seamless Battles Electricweld

Comparison of Tubular Steel Shipments (Net Tons)

Month 1960	Seamless Products	Electricweld Products
January	346,737	279,455
February	300,249	223,672
March	283,552	219,169
April	250,126	229,255
May	201,467	248,671
June	170,804	265,646
July	156,470	230,008

Source: American Iron and Steel Institute

Cancellations Hit Machine Tools

New Orders for September Down From August

But it could be a good sign. New developments seen at the Show may have prompted revision of tool buying plans.

It still could be the best year since '57.—By T. M. Rohan.

■ A good many visitors to the Machine Tool Show in September saw enough to make them change their mind about what equipment they wanted for their shop.

One of the most significant results was $6.5 million in cancellations—more than three times higher than any other month this year. It's hoped the cancellers saw something better at the show than what they have on order and so cancelled.

They are expected to be back in a month or two with a new order after re-planning and getting OK's. Much of this could be a switch to tape-controlled machines which dominated the show.

Another Viewpoint — Another school of thought is that cancellations came from new higher prices. Despite the bulking cancellation figure, net new orders for cutting type tools were $42.4 million compared to $47.8 in August. The backlog inched up from 4.1 months to 4.2 months.

The heavy cancellations were almost all from domestic consumers. But the foreign market more than saved the day with $16.4 million orders or a whopping 38 pct of the total for the month. This continued the rise in foreign demand which has pushed foreign orders so far this year to $109 million or about 28 pct of the total market so far of $271 million. The foreign buyers also apparently didn't change their mind as easily since their cancellations for the month was only $300,000.

Official Word—"It's still a little too early to gage the effects of this year's Machine Tool Show since visitors haven't had time to put in new orders," said Ludlow King, National National Machine Tool Builder Assn. executive vice president.

"But the numerical control people who exhibited there are the most enthusiastic group of exhibitors," he remarked.

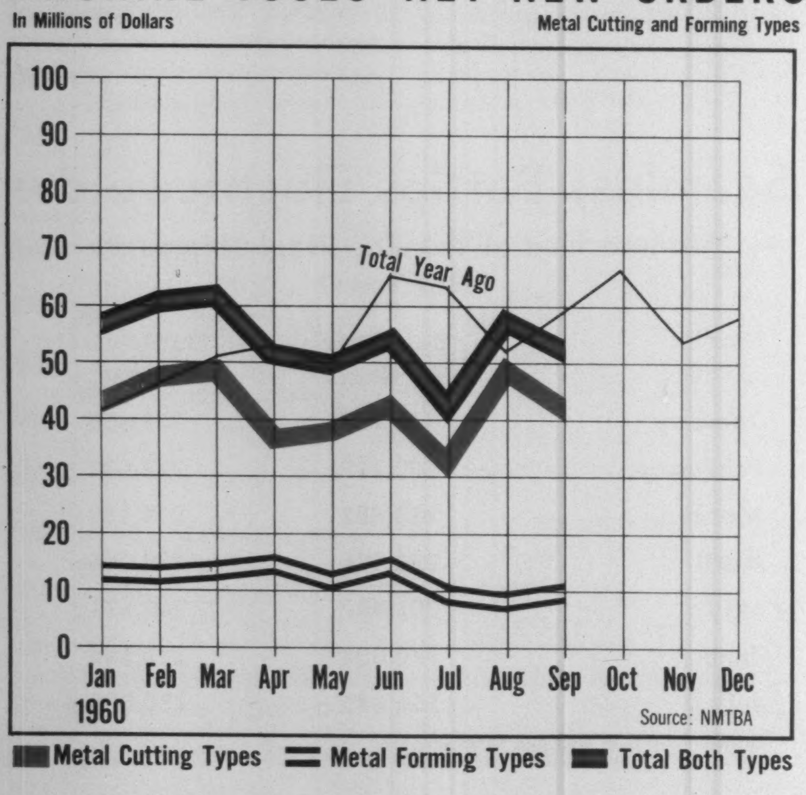
A $500,000 Year?—"The continued good market for tools in foreign countries is, of course, encouraging. But we don't know how much longer it will last. Much of the tools are going into auto plants over there. By the time they are finished tooling, they will have a tremendous capacity for making cars which they will have to absorb at home."

Prospects for a $500 million year in machine tool shipments are still good, based on a good third quarter. Shipments at $381 million are neck-and-neck with orders at $380 million through the third quarter.

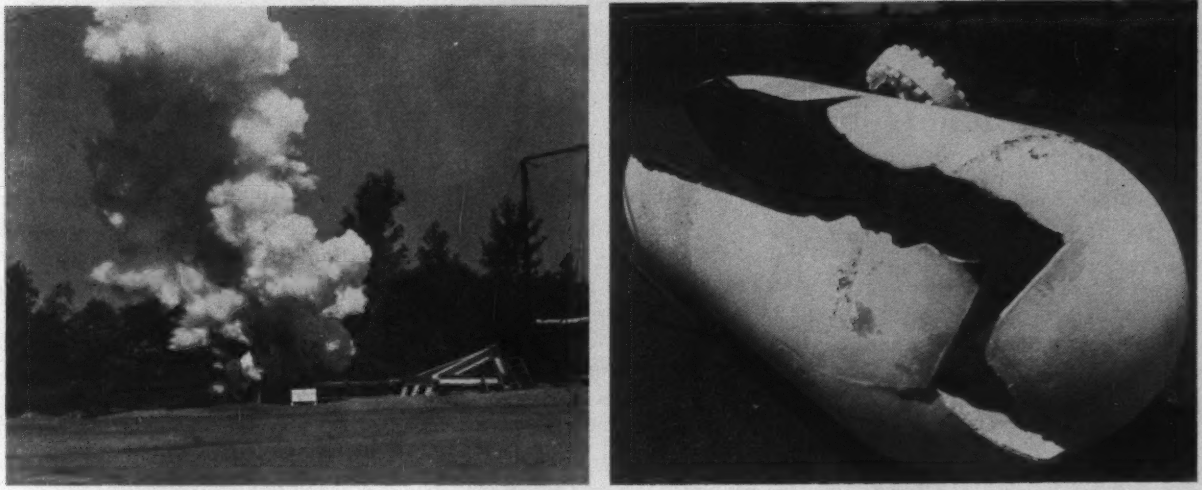
Forming Tools — The forming tool picture was relatively better than cutting type tools for September, according to the NMTBA report. Net total new orders were $9.9 million, the best since June.

Bulk of the increase came from the export market which accounted for $3.9 million total against $6 million domestic. Shipments exceeded new orders, cutting the industry backlog mildly from 3.8 down to 3.6 months. Total shipments were the year's third best at $13 million, bringing the three quarter total to $109 million against $107 million new orders.

MACHINE TOOLS-NET NEW ORDERS



Source: NMTBA



RIPS UNDER STRESS: Nine-pct nickel-steel pressure vessel, at —320°F, rips open under a load six times the design stress. Ductile tear points up safety of vessel despite the lack of stress relieving after welding.

More Competition in Cryogenics

Tests dramatize move of 9 pct nickel steel for a share of the fast-growing cryogenics market.

Problem is to prove the grade does not need stress relieving.

—By C. L. Kobrin.

▪ In a dramatic series of tests, held at U. S. Steel's Fairless Works, 9 pct nickel steel has taken aim at a larger slice of the new cryogenics market.

"Operations Cryogenics," a joint venture of the International Nickel Co., Inc., Chicago Bridge & Iron Co., and the U. S. Steel Corp., subjected 9 pct nickel steel to destructive tests at temperatures around —300°F.

The reason: to show how tanks and pressure vessels made from this steel withstand impact shocks and very high pressures at low temperatures. One point, in particular, to be made: The steel needs no stress relieving after welding. The result: Onlookers were impressed with the performance of the steel.

Liquid-Gas Use Grows — The cryogenics field is a fast growing one. Existing markets are rapidly expanding.

Consumption of liquid oxygen by the steel industry, for example, has grown by leaps and bounds in the last five years.

Material Requirements—One important factor, not to be overlooked, is the material to contain these cryogenic fluids.

As L. B. Worthington, president, U. S. Steel, pointed out, "The business of processing, transporting, and storing these liquid gases is one of America's fastest growing industries." And, as J. R. Gordon, president of Inco stated, "We believe that 9 pct nickel steel is one of the outstanding new materials for the design engineers in this field."

Stainless Moved In—In the last two years, more than 200 pressure vessels for containing liquid gases have been made from this steel. However, stainless steels and aluminum alloys, also suitable to contain these liquids, have been used in far greater tonnage.

Why is this? As spokesmen for this test program pointed out: It's not a question of cost. Stainless steel costs about 55-60¢ as compared to 31½-33¢ for 9 pct nickel steel. It's not a question of strength, they contend. The nickel steel has greater strength at low temperatures than the aluminum alloys.

The Problems—The problem for nickel steel, they indicate, centers around the need for stress relieving after fabrication. According to the ASME Boiler and Pressure Vessel Code, nickel-steel vessels, for service down to —320°F, must be stress-relieved. And stress relieving a field-erected structure is, very often, impractical and costly.

Thus, "Operations Cryogenics" was born and the series of tests prepared. One test consisted in pressurizing a nickel-steel vessel, in the as-welded condition—and full of liquid nitrogen at —320°F—until it burst.

Results show that it withstood pressurization as well as an identical vessel that had been stress relieved. Other tests gave similar results.

What's the outcome? For sponsors of the program, it strengthens belief that not all ferrous materials need stress relieving after welding.

At 50%, Steel Earns a Profit

Most Companies in the Black in Third Quarter

In spite of operating at about 50 pct of capacity in the third quarter, most steel companies edged into the black.

New equipment and management techniques are paying off in the mills.—By R. D. Raddant.

■ Steel companies find little to cheer about in third quarter earnings. At best, they find consolation in two points.

First, improvements in steelmaking and management are paying off. Most companies made some profit, or at least avoided losses, at an operating rate of 50 pct. In contrast, a few years ago a rate of 75 pct of capacity was needed to avoid a loss.

Second, analysis of inventories and other market factors convinced most executives that the bottom had been reached and the worst was over.

But, except for professional optimism here and there, most steel company executives put back the recovery point for from three to five months. This confirms earlier predictions that the upturn will not hit until into 1961.

One Hopeful Point—Amid the statistical gloom, Roger M. Blough, U. S. Steel Corp.'s chairman, researched one hopeful point. Actual steel consumption this year, he said, will reach from 76 to 77 million tons. This would be the second best year for actual steel use.

And, obviously, it means that steel inventories are at or near absolute bottom. Even at a relatively slow rate of production by steel users, steel buying will have to pick up.

Steel Earnings—1960 versus 1959

COMPANY	THIRD QUARTER 1960	THIRD QUARTER 1959
U. S. Steel	$52,415,599	$31,135,136
Bethlehem	12,436,106	38,926,913*
Republic	7,310,271	24,861,406*†
Jones & Laughlin	3,483,000	16,465,000*
National	8,061,074	2,821,000
Inland	5,135,369	7,449,109*
Armco	11,693,836	8,852,698
Youngstown Sheet & Tube	2,676,626	7,149,660*
Colorado Fuel & Iron	5,615,161**	6,224,477*
Wheeling	558,000†	4,263,000†
Crucible	1,825,711*†	2,034,090†
Pittsburgh Steel	671,040*	4,105,001
Kaiser	5,802,364*	10,894,581*
Granite City	1,789,858	3,260,008
Allegheny Ludlum	647,902	3,913,320*
Detroit Steel	100,533	2,844,530†
Alan Wood	82,018*	985,440
Continental	812,958	1,057,379
Washington Steel	351,035	759,205
Eastern Stainless Steel	87,810	713,130
McLouth	3,445,658	3,193,566*
Copperweld	40,443*	684,775

* Net Loss. † Tax Credit Involved. ** Net Loss—Non-recurring Loss of $3,598,111 from sale of Claymont plant.

Similar thinking was advanced by Bethlehem Steel Corp.'s chairman, Arthur B. Homer. Mr. Homer says steel inventories are now at about 12 million tons. This is about the same level as at the end of the steel strike last year.

Following the strike, inventories were built up to a level of about 18 million tons relatively early in the year. Since then, six million tons of inventory were used up without replacement. Mr. Blough's principal point in the steel recession is that users continued to trim inventories long after the point where he, and others, believed they would be stabilized. His figure is about 6 million tons lower than the predicted point.

Although there are dissenters, most in the industry now expect 1960 production to run close to 100 million tons, Mr. Blough's figure. Charles M. White, Republic Steel Corp. chairman, is the leading optimist.

Dividends Paid — Although the companies sustaining losses were in the minority, only two of the major producers, U. S. Steel and National Steel Corp., earned their dividend in the third quarter. Generally, however, the regular dividend was paid.

A profit on less than 50 pct operating rates is still startling to many in the business world. The question is: How is it done? The combination varies by company, but the answer lies in these points:

New methods of steelmaking: Oxygen furnaces and the installation of oxygen equipment in openhearths, for example.

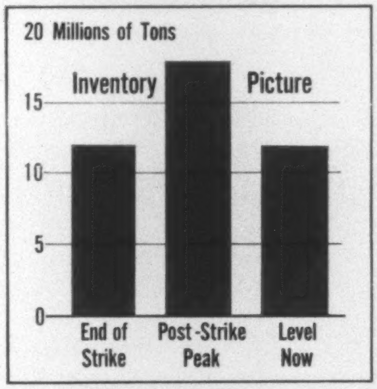
Automation of office and business methods: This includes automatic handling and transmission of orders, automatic scheduling at the mill, and inventory control by computer.

Strides in the improvement in existing equipment: This includes finishing operations as well as steelmaking.

Another factor in mid-year steelmaking is the bringing into balance of exports and imports. As it stands now, there is likely to be a moderate "favorable" balance of trade in steel products.

Through August, imports totaled 2.7 million tons against exports of 2.27 million tons. Since summer, the rate of export has exceeded imports, but not enough to counterbalance an early surge of imports. The early excess of imports can be traced to automotive steel, ordered during the strike, but which could not be cancelled after the post-strike buildup.

Strikes, Taxes, and Mixes—Year-ago comparisons of earnings (see table) of third quarter of this year against third quarter of 1959 offer little basis. During the third quarter of last year, most of the industry was strike-bound and losses were severe.



In addition, tax credits in the third quarter of this year distorted even the small profits (or losses) of many of the companies.

Product mix also is reflected in earnings. Companies heavy in oil country goods were hard hit. National Steel Corp., on the other hand, is heavy in automotive steel (particularly sheets), tinplate, and galvanized. All these products remained relatively strong resulting in a comparatively good profit.

BRIGHT STRIP: Supervisors watch stainless strip enter a furnace.

Stainless Annealing Goes Commercial

Bright annealed stainless is now available for auto and appliance use.

Allegheny Ludlum and its subsidiary, Wallingford Steel, are in commercial production. Other mills interested.

▪ Commercial production of bright annealed stainless has been announced by Allegheny Ludlum Steel Corp.

The product is being made by the company on new facilities at West Leechburg, Pa., and at Wallingford, Conn., by Wallingford Steel Co., a subsidiary of Allegheny Ludlum.

Auto, Appliance Use — Bright annealed stainless is going into 1961 automobiles, into appliances and other products, says Allegheny Ludlum.

"The new product represents a major improvement in the surface lustre and corrosion resistance of stainless steel," says W. B. Pierce, vice president in charge of sales. "And for the first time bright annealed stainless strip is available in tonnage quantities in the type, widths, and gages most used by auto and appliance manufacturers."

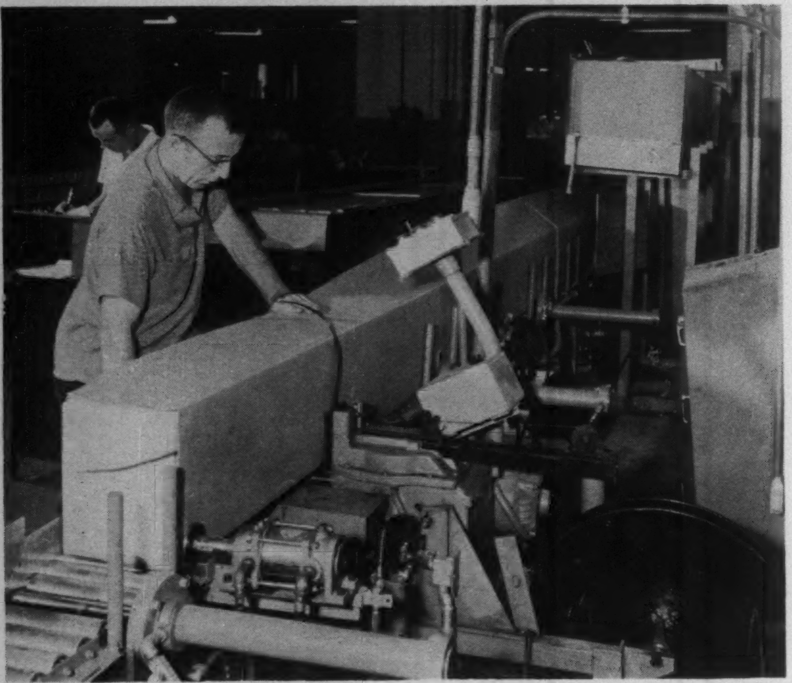
Bright Surface Held—The bright annealing process employs a controlled atmosphere in the heating cycle. This protection preserves the bright surface of strip. The process is not new, but until recently it was used mostly for thin-gage specialties, produced in limited quantities and priced accordingly.

Throughout the stainless industry, bright annealing has stirred strong interest. Producers have been under pressure to come up with a better combination of bright finish and corrosion resistance.

Other Steelmakers Interested — As an answer to this need, Wallingford Steel and Allegheny Ludlum came up with the idea of bright annealing on a production basis. Since these first moves at least two other producers have ordered bright annealing equipment and one more has made arrangements for bright annealing of its product.

The new units at Allegheny Ludlum are geared to production volumes and costs. Built by General Electric Co., the new furnaces stand over 100 ft, operate at high speeds. Allegheny Ludlum says they are the "first furnaces in the industry to produce bright annealed stainless strip in commercial tonnages . . ."

Power Is Used In Packaging



WELL BOUND: This packaging installation, built around a Signode M2-ER Power Strapping Machine, is used in the packaging of aluminum and steel components for store fronts. Two men can handle the operation that previously took six men. The result is lower handling costs.

St. Lawrence Seaway Readies for Winter

The St. Lawrence Seaway canals will be kept open, weather and conditions permitting, until Nov. 30. The Welland Canal, however, is scheduled for closing Dec. 15.

Vessel movements through the canals will not be permitted after these dates, and shippers have been notified to make shipments before these dates to avoid wintering above Montreal.

AT&T Makes Plans For Satellite

The latest step in the move toward commercial satellites was taken last week when the American Telephone & Telegraph Co. filed a two-fold request with the Federal Communications Commission.

The company requested: Permission to go ahead with an experimental transmission station; and, a change in FCC rules which would allow AT&T to proceed, after satisfactory tests, with commercial service. There was no immediate ruling by the commission, but approval of the first request is expected soon.

Cooperative Move—A company spokesman told The IRON AGE that existing equipment and data would be used in the preparation of the project. It is expected that the move will be made in cooperation with the National Aeronatics and Space Administration.

Barring any unforeseen developments, AT&T hopes to have the 175-lb satellite in orbit within the next year.

Henry T. Killingsworth, vice president of the company, says, "We are planning a system that would make use of a solar-powered satellite orbiting at an altitude of 2200 miles."

Signal Catcher — The satellite would contain electronic amplifiers which would catch signals from earth, boost the output, and relay the signals to stations in the United States, United Kingdom and Western Europe.

Construction of transmission and relay systems on ground is expected to start in the near future.

The actual satellite itself would be 4 ft in diam. Its surface would be 60 pct glass coated solar cells. The remaining portion of the surface will be composed of a metal skin and two slotted antennas.

Contracts in Offing For Navy Satellites

Defense contracts for sea-launched satellites are in the offing. The U. S. Navy plans to go ahead with its program to set up ships as mobile launching platforms.

Admiral John T. Hayward, Deputy Chief of Naval Operations for Development, says the Navy is "pursuing the program avidly."

Sea-launched satellites are valuable because they can be put in any desired orbit. This is not true of satellites shot from fixed positions. The major obstacle is, as usual, money. The satellite must be orbited at reasonable cost. Says Admiral Hayward: "Boosters are too expensive. The booster is taking up the money that should be put into the payload."

It's A "Light" Standard

A new international standard of length—a wavelength of light—has been adopted. It replaces the meter bar which served as the standard for more than 70 years.

The announcement was made recently from Paris by Dr. Allen V. Astin, Director of the National Bureau of Standards, U. S. Dept. of Commerce. The action was taken by the 11th General Conference on Weights and Measures in Paris.

Other actions taken by the Conference include the establishment of a central facility at the International Bureau of Weights and Measures for international coordination of radiation measurements and confirmation of a new definition of the second of time.

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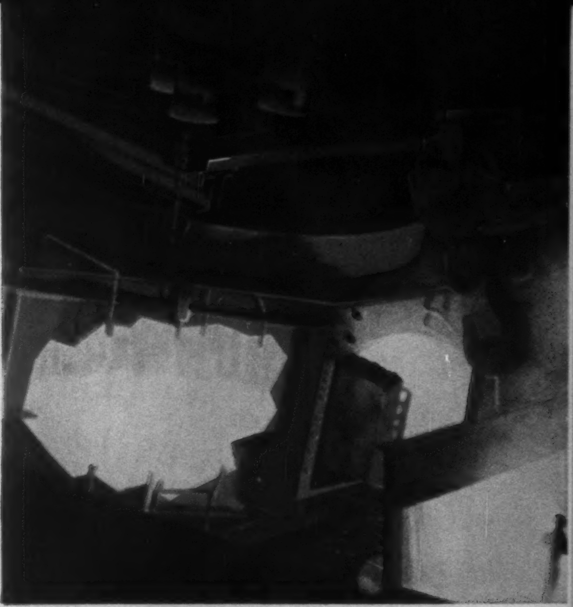
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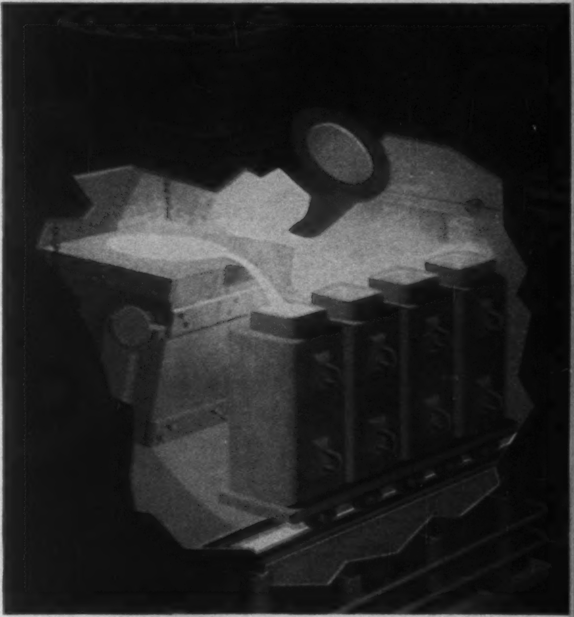
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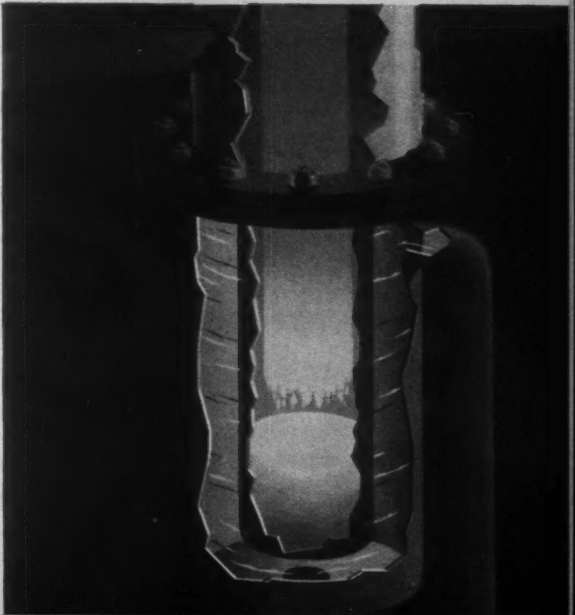
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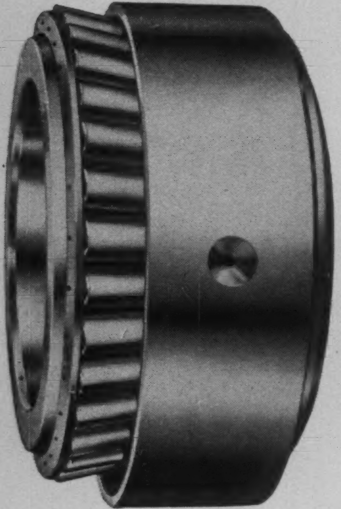

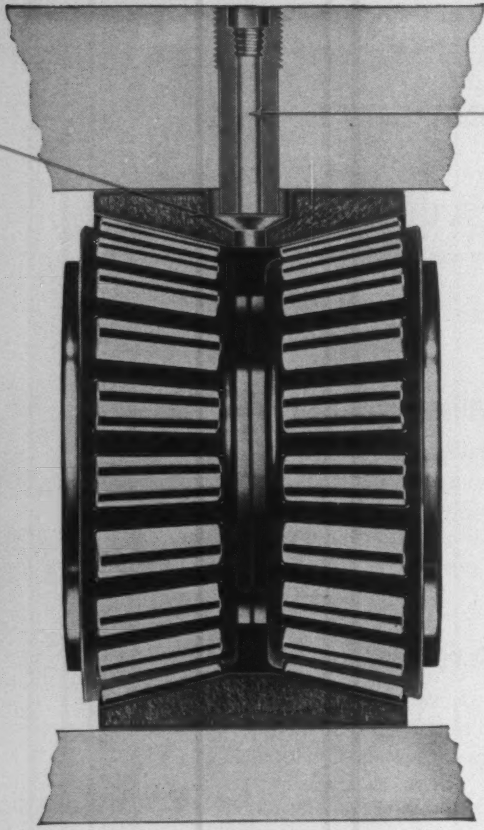

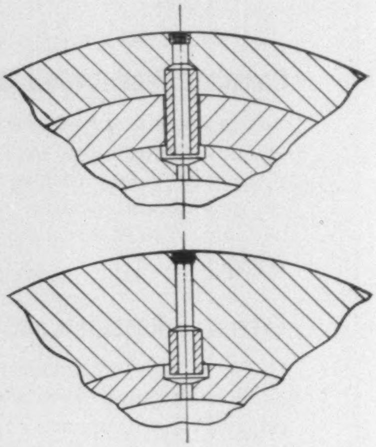

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Wanted: Managers to Manage

Competitive business conditions are putting heat under managers who decide by committee vote or on the advice of specialized experts.

More companies are looking for men willing to make decisions and stand by them.

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More boards are growing tired of decision by committee or planning based only on surveys. In short, it appears the management honeymoon is over.

The director of a large business association says: "Many companies say they are fed up with group responsibility for planning. They don't like it when a manager, or even the president, points to a group decision when there's a blunder. And they also don't like it when he blames some specialist in marketing, industrial relations, or finance when things go wrong.

"The old-fashioned idea that a manager is hired to make decisions—and take the rap for bad ones—seems to be coming back."

Start With Trainees—This trend reaches right down to the level of management recruiting and training. Recruiters say the demand for top men is as strong—or stronger—than ever. But companies hemmed in by the cost squeeze, rougher competition, and labor problems want managers who can manage.

One recruiter, Cadillac Associates, Inc., Chicago, points out, "Executives are now being asked to share the woes and not just the joys of married life. The need for competent executives in industry is just as desperate as ever. But companies no longer accept warmed-over bodies whose sole claim to fame is a diploma or a good conduct medal from a men's club bar. Now, they are wanting much more and we are glad of it."

Management development is also coming in for some hard knocks. A seasoned businessman, speaking about psychological testing, says, "Some of these tests are screening out men with daring and inventiveness. In searching for sound conformists, business rejects recruits with the very qualities that built up American business."

Off-the-Job Training — Another outspoken critic is Robert N. Hilkert, first vice president, Federal Reserve Bank of Philadelphia. He notes that one of the bank's officers, after interviewing applicants, said, "These fellows don't want jobs—they want fellowships."

Mr. Hilkert suggests management spend less time devising fancy programs of off-the-job training. A manager grows mainly by performance on the job. He does suggest, however, that some off-the-job work and study is needed to develop well-rounded managers. But he asks if employers should always foot the bill. And he adds, "There was a time when it was said that a man earned his salary while working on the job. He earned his promotions off the job."

. . . What Kind of Training?

▪ Much management training in the post-war period has been built around seminars, lectures, development programs, and business games. But is this the soundest way to develop executives?

Commenting on this, Mr. Hilkert says one idea taken perhaps too seriously today is success through training programs. "And," he asks, "What is the best program?

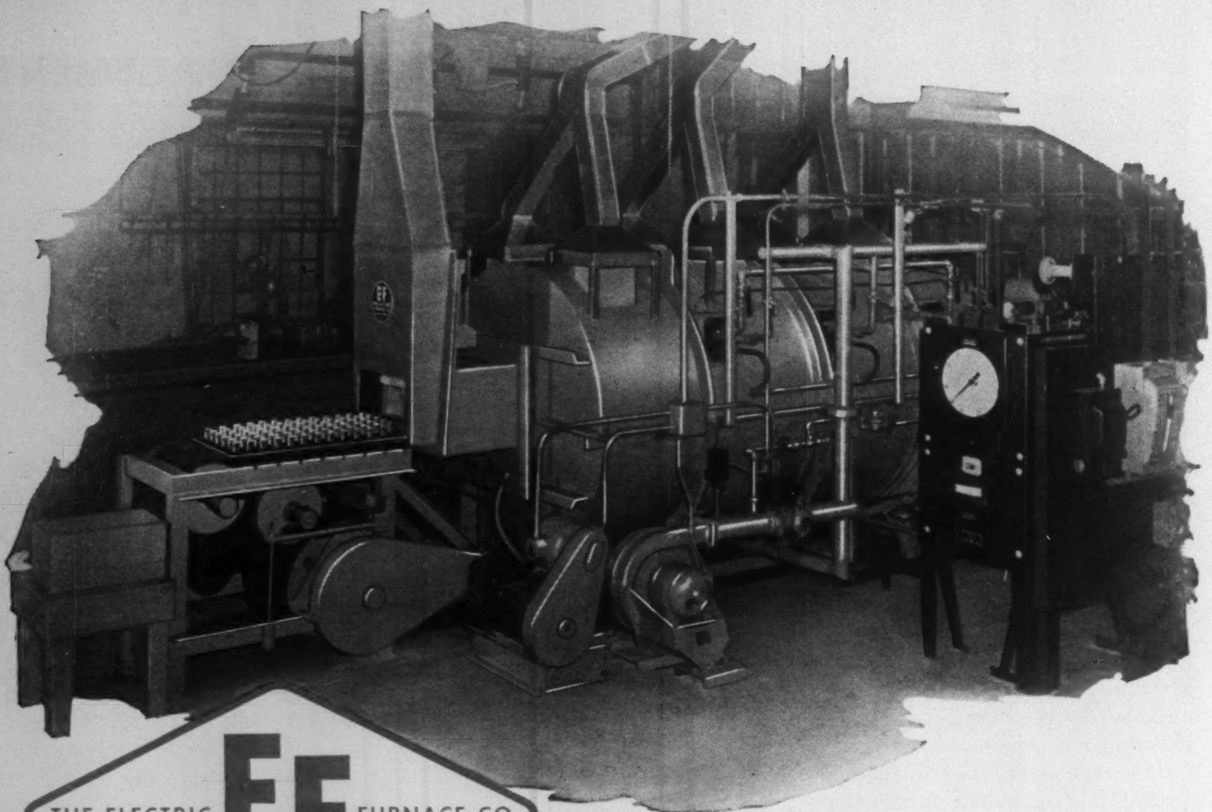
"Is it the one with the greatest number of lectures and seminars? Is it the one which boasts the most elaborate audio-visual equipment? Is it one that features job rotation, except that yours rotates faster than others?"

Work or Watch?—"Is it one that offers the biggest number of opportunities to observe, and perhaps the fewest to take part? Is it the one which provides a great range of experiences, without being held responsible or accountable? Is it the one which requires the most study and the least work?"

He then adds: "All work and no study leads to underdeveloped managers. But all study and no productive work will not produce mature managers either. . . . It is by giving thought to these extreme positions that we are more likely to come up with a better 'product-mix.' "

At best, he notes, management can create an atmosphere which will encourage growth. Then it is up to the man to do his own growing.

It's also important to note that men grow at different rates and this must be taken into account.



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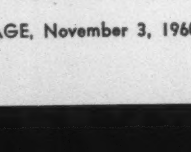

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Engineers See Stainless Engine

Special Powerplant Is Both Light and Powerful

It may be a long time before your car from Detroit has a stainless steel engine.

But a special engine could spur greater use of this material before long.—By A. E. Fleming.

▪ Detroit automotive men got their first look at a new stainless steel engine last week during the 15th annual American Society of Body Engineers technical convention.

The four-cylinder engine's block is made of thin, stainless sheet. Included in the parts made of the brazed sheet are combustion chambers, cylinders, water jacket, intake and exhaust ports, upper block pan and spark plug tubes. Type 302 stainless is used, a grade which has been employed for a variety of other applications including pots and pans, rocket support stands and building fronts.

Lighter Than Aluminum — The engine is very light. One model, for instance, delivers 175 hp but weighs only 175 lbs. In contrast, weights of some aluminum engines in American cars are: Corvair, 282 lb; Falcon, 348 lb; and Buick, around 350 lb.

Designed by Lloyd Taylor and produced by Tyce Engineering Corp., Chula Vista, Calif., the engine uses stainless in several unusual ways. The special block design, for one thing, does away with the head gasket and allows very high compression ratios up to 14-to-1. Also, a .063 in. steel liner in each cylinder gives excellent wear resistance, its producers say.

Borrowed From Detroit — Four displacements are available — 91, 105, 120, and 135 cu in. They can be changed from size to size by simply replacing the crankshaft to change the stroke.

Several standard parts from Detroit cars were adopted for the Tyce/Taylor engine. They are the Thunderbird intake and Pontiac exhaust valves, six-cylinder Chevrolet valve guides and six-cylinder Ford connecting rods.

Due for Tests—The engine is scheduled soon for tests in sports cars and racing car competition.

Price of the engine reportedly will be $1500 to $2300, depending on displacement and accessories. The manufacturers say this is competitive with present marine engines and European sport car engines.

Stainless Brightens '61 Models

Although stainless steel orders by automakers have been sluggish this year, stainless retains an important role in automotive brightwork. Here's a brief summary of some stainless steel trim use on 1961 cars:

Falcon—Optional full-length side molding surrounds the sculptured side panel and wraps around the taillights.

Corvair—Rocker panel molding is on the Monza sports coupe.

Comet — Has a body-length side holding.

Lancer—Entire grille is made of roll-formed stainless.

Tempest — Has stainless rocker panel molding.

Special—Car-length molding functions as a protective rub strip.

F-85 — Uses body molding from headlight to rear wheel opening.

Lark—Molding encircles body.

Classic Six — Has fender cap and and belt-line molding.

Ambassador — Headlight eyebrows and belt-line molding are stainless.

Plymouth—Body molding extends from headlights to middle of the trunk lid.

Ford—Molding extends from front fender to rear bumper, plus a narrow rub strip from tailfin to doorline.

Dart—Body moldings sweep rearward from doorline to taillights.

Chevrolet—Windshield and window surrounds, and wheel covers are stainless.

Pontiac—Full-length side moldings are tapered; molding for split grille.

Oldsmobile — Side body molding runs car length.

Mercury—Car-length body molding has rubber insert.

Buick—Fenders have narrow molding.

Cadillac—Thinline rub strip runs from front wheel opening to rear bumper.

Lincoln—Grille and trunk-lift moldings, bumper surrounds; rub rails are full length.

Chrysler—Rub strip from headlight to front door line is tapered.

Imperial—Bumper deck panels are stainless.

Thunderbird—Thinline rub strip extends from front bumper to taillight.

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Set No. D-26B A through Z	23.79
Set No. D-80B No. 61 through No. 80	6.35
Total price complete with metal containers: 135 pieces	$79.71

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Bethlehem May Expand in West

More Facilities Would Increase Its Product Mix

Rumors have existed for a long time that Bethlehem would expand its product range in the Farwest.

Best guess: More finishing mills will be built to process coils shipped in from the East Coast.—By R. R. Kay.

■ Will the West Coast get more steel finishing facilities?

Here's what's been happening: About half of Bethlehem Steel's board of directors slipped into San Francisco last week.

The big question: Is Bethlehem getting ready to start a huge expansion program that could run up to $100 million?

Fitting It Together—Putting bits and pieces together you come up with something like this:

Several months ago, the company bought 575 acres of land adjoining its south San Francisco works. When the buy was made, H. H. Fuller, Bethlehem vice-president, announced it "would provide for possible future expansion."

So the speculation grows that Bethlehem is taking a hard look at its Bay Area operations. There's also the feeling it's moving a step closer to expanding them.

Bethlehem Silent — Of course, company officials won't confirm or deny expansion plans until they're firmed up. But rumors have it that Bethlehem would build facilities in south San Francisco to make hot- and cold-rolled sheets, tinplate, and galvanized.

One competitor sees it this way: Bethlehem could ship hot-rolled coils from its Sparrows Point plant, near Baltimore, to the San Francisco Bay Area via the Panama Canal.

Then newly-built finishing mills at south San Francisco would make cold-rolled products, including tinplate and galvanized. Right now, the company brings them in from the East Coast.

Expansion's Aim — For many years, there's been talk that Bethlehem would build an integrated mill in the San Francisco area. You don't hear much about that any more.

But it seems more likely the company would build finishing facilities for light flat-rolled products. Estimated cost: $75 million to $100 million.

Such an expansion would certainly improve Bethlehem's competitive position in the Farwest. It's well known that the company's West Coast-made product mix is far from ideal.

Should Bethlehem go ahead with this expansion, they will need to watch their competitive position.

New Press for Alcoa

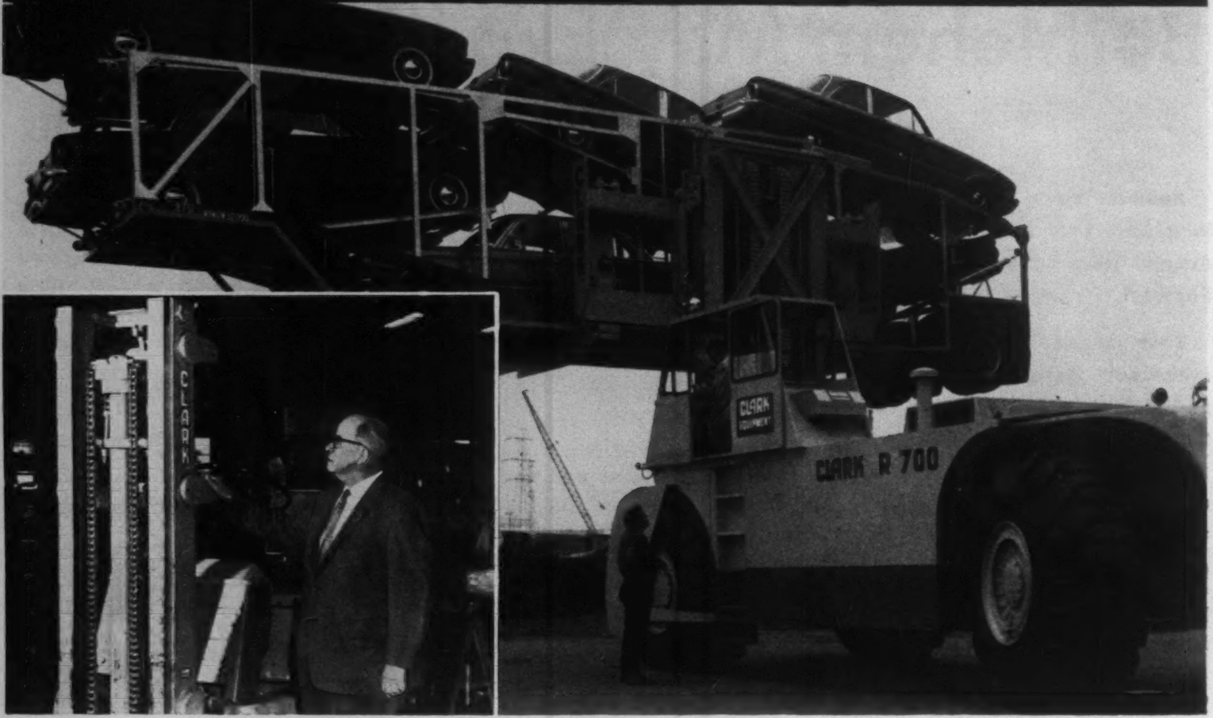
Aluminum Co. of America is now operating an electronically controlled extrusion press at its Vernon, Calif., plant.

The 5200-ton unit can produce and process extrusions up to 34 in. sq in cross sectional area.

Phased-Out Missile Serves as Target

ROCKET LAUNCHED: An M-34 solid propellant rocket motor launches obsolete Regulus missile for use as target drone. M-34 was designed and built by Rocketdyne, a division of North American Aviation.

CONNORS special sections at Clark . . .

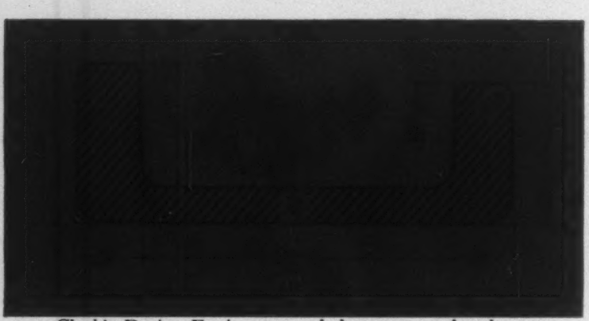


Clark Ranger-700 Lifts Truck Trailer Load of New Cars — New Truck Can Lift 35 Tons.

"This Connors Special Section makes our upright the best built upright in the industry," says John G. Mack, Vice President of Purchasing, Clark Equipment Company.

"Connors special rolled steel sections permitted us to improve our design and provide an upright with just the proper weight distribution for the ultimate in strength," notes Mr. Mack.

"By utilizing these special, high quality sections, we have given our customers the best design with better wearing qualities and have also expedited our assembly, thereby increasing production efficiency."



Clark's Design Engineers needed an uneven leg, heavy channel section to work in conjunction with an "I" beam section in their lift truck mast assembly. Connors produced and hot rolled a special section designed to meet their rigid specifications — providing proper weight distribution and the ultimate in strength.

Investigate the advantages of special sections.

For illustrated brochure or consultation write or call Connors — Specialists in Special Sections
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Food Machines Work for Space

Stainless Screw-Type Kneader Aids Propellant Making

A wide variety of machines play a vital part in building missiles for the space age.

Here's the story of how food processing machine experience helps power rockets.

—By R. H. Eshelman.

▪ Many metalworking companies, a wide range of specialties and new techniques are needed for success of missile and space programs. To keep technology forging ahead rapidly means a constant stream of relatively obscure developments. Sometimes the thread is difficult to follow. But here's one which starts with a machine builder and runs through making of fuel for rocket motors.

The key link is a unique machine for continuous processing of solid fuel propellant such as used by Polaris missiles. Made by the food and chemical machinery division of Baker Perkins Inc., Saginaw, Mich., this mixer unit is termed a production breakthrough by the U. S. Navy. It bridges a bottleneck in production of rocket fuel, giving a higher grade product with greater safety and with a cut in direct labor content of more than 80 pct.

Critical Point—But manufacture of the weird propellant kneader, which resembles a cut-down five in. naval gun mounted on a pedestal, hinges on a special grinding operation. This job on the stainless mixer screw is critical. The piece-part is nearly 10 feet long. No machine was available to handle the job.

The chemical machinery maker's engineers huddled with machine builders. Result is a special 24-in. Cincinnati roll grinder in the large machine shop. It's reported saving as much as two days' production time. Previously it had to be handled in the overworked lathe department.

Combination — Production experts at the plant have brought to bear experience on both chemical and food machinery to these technical problems of making equipment for the aerospace field. And this cross-fertilization of ideas works in reverse, too.

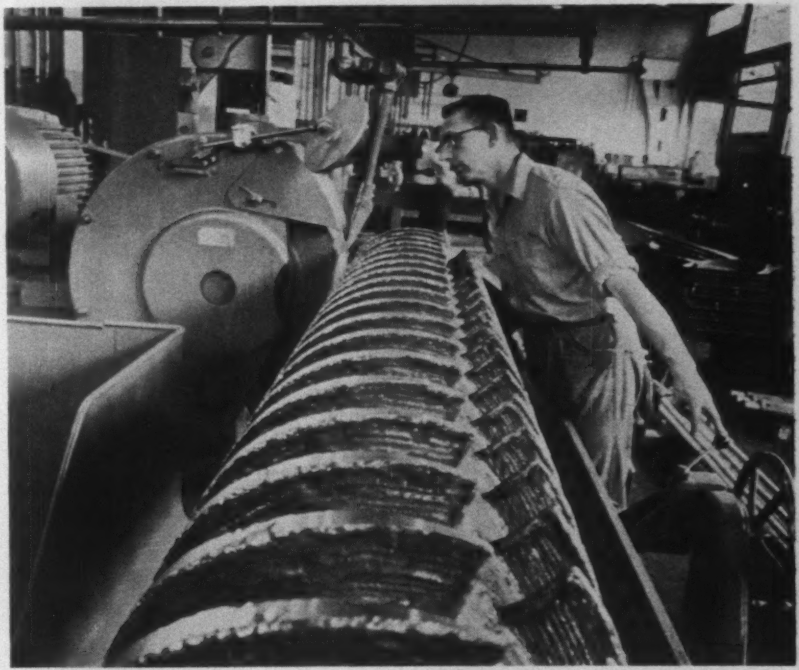
The new setup will now handle shafting, spindles, special type mixer blades and complicated screw shafts —such as the missile fuel job—for both these other industries.

The new grinder will handle work in diameters of 1 to 24 in.; lengths up to 10 ft. It has a table traverse of 3 to 120 in. per minute. Table swing is a bit more than 25 in., and there's 120 in. between centers.

Shorter Time—During grinding, the work rotates in the same direction as the grinding wheel. It finishes the hardened or hard-surfaced outside diameter and sides of the three rows of interrupted flights of the precision blades on the outer perimeter of the large shafts.

When done by turning several setups were needed, using carbide cutting tools. Machining time ran between 35 and 45 hours. With the new operation, this phase of the work only takes about 10 to 15 hours.

Each of the flights on the screw shaft positioned in the machine is about 2½ in. wide at its widest point, tapering down on both sides.



MACHINING FOR SPACE: Special Cincinnati grinder finishing precision mixer screw of the type used in mixing solid-propellant fuel for rocket engines. Note rough character of work being ground.

INDUSTRIAL BRIEFS

On the Beam—A contract for the study and development of electron beam welding of electrical connections for micro-assemblies has been let to Hamilton Standard's Electronics Dept. by the U. S. Army Signal Corps. H-S holds North American technical and manufacturing rights to the electron beam process for welding and cutting developed by the Carl Zeiss Foundation of West Germany.

By a Waterfall — Westinghouse Electric Corp. is installing the first of 13 huge waterwheel generators at the Niagara Generating Plant of the $720 million Niagara Power Project. The project is being built by the New York State Power Authority. The generators are rated at 150,000 kw each.

Solar Testing Unit — General Electric Co.'s Missile and Space Vehicle Dept. plans to erect a new solar test facility with a large moveable section for exposing equipment to the sun. To be built near Phoenix, it will be large enough to test the biggest solar powered static generating systems now being built for space applications. Construction is scheduled for this month. First operations should begin prior to Feb. 1, 1961.

South Pacific—Pennsylvania Engineering Corp., New Castle, Pa., has signed a second license agreement arranging for the manufacture of its basic oxygen converters in foreign countries. Kawasaki Dockyard Co., Inc., Kobe, Japan, will manufacture PECor oxygen converters and auxiliaries for installation in Japan, South Korea, Nationalist China, South Viet-Nam, Thailand, Indonesia, Burma and the Philippines.

New Link—The Union Chain & Manufacturing Co. of Sandusky, O., has been acquired by Hewitt-Robins Inc. Union Chain produces conveyor and power transmission chains and will be operated as a division of Hewitt-Robins.

Space Formation—The General Astrometals Corp. has been formed to produce metals, ceramics, and cermets for high-temperature and nuclear applications. It will produce and sell beryllium metal and beryllium metal products under license to Pechiney of France. Offices, plant and laboratories are located at 320 Yonkers Ave., Yonkers, N. Y.

Officers for Plastics Engineers—F. W. Reynolds, manager, IBM's Plastics Laboratory, Endicott, N. Y., is the new 1961 president, Society of Plastics Engineers. Officers elected include: Vice president, engineering—J. R. Lampman, General Electric Co., Syracuse, N. Y.; Vice President, administration—John Delmonte, Furane Plastics Co., Los Angeles; Secretary—M. F. Malone, Canadian Resins & Chemicals Co., Shawinigan, Que.; Treasurer—John Berutich, Haveg Industries, Louisville.

Dealing in Staples — Bostitch, Inc., has purchased 41 acres of land in Clinton, Conn., on which a modern wire mill will be built for Universal Wire Co., a subsidiary. The new plant will produce a substantial part of the Bostitch requirements of stapling wire and attaching wire. Construction will start the end of this year. Universal Wire is presently located in Stamford, Conn.

A Larger Hooker — Hooker Chemical Corp. is again expanding capacity for making Oldbury-brand sodium chlorate at the Columbus, Miss., plant of its Eastern Chemical Div. With more chlorate cells and electrical equipment required, the expansion program is utilizing space provided earlier in existing buildings and employing finishing equipment on hand.

More Precise Title—The Skinner Chuck Co., New Britain, Conn., voted to change its name to Skinner Precision Industries, Inc. Also, the company's Chuck Division will be known as Skinner-Horton Chuck Div. The name of the Valve Division will remain the same—Skinner Electric Valve Division.

New Lab for U. S. Steel—U. S. Steel Corp.'s Gary, Ind., Steel Works will soon have new plant metallurgical laboratory facilities. It will include four buildings of the latest curtain wall, enameled steel panel construction. They will be fabricated and erected by U. S. Steel's American Bridge Div. to replace present lab facilities.

On the Quinnipiac—The New England Div., Frederic B. Stevens, Inc., Detroit, has been moved from New Haven to 440 S. Colony St., Wallingford, Conn. A well-equipped lab for testing metal finishing materials and equipment is being established in the new building. In addition, Stevens is also increasing its capacity for lining plating and processing tanks.

Triple Space—Carpenter Steel Co. opened a new mill-branch warehouse and specialty steel service center in Cleveland. Located at 4901 W. 150th St., the center has triple the warehouse storage capacity of the company's former facility.

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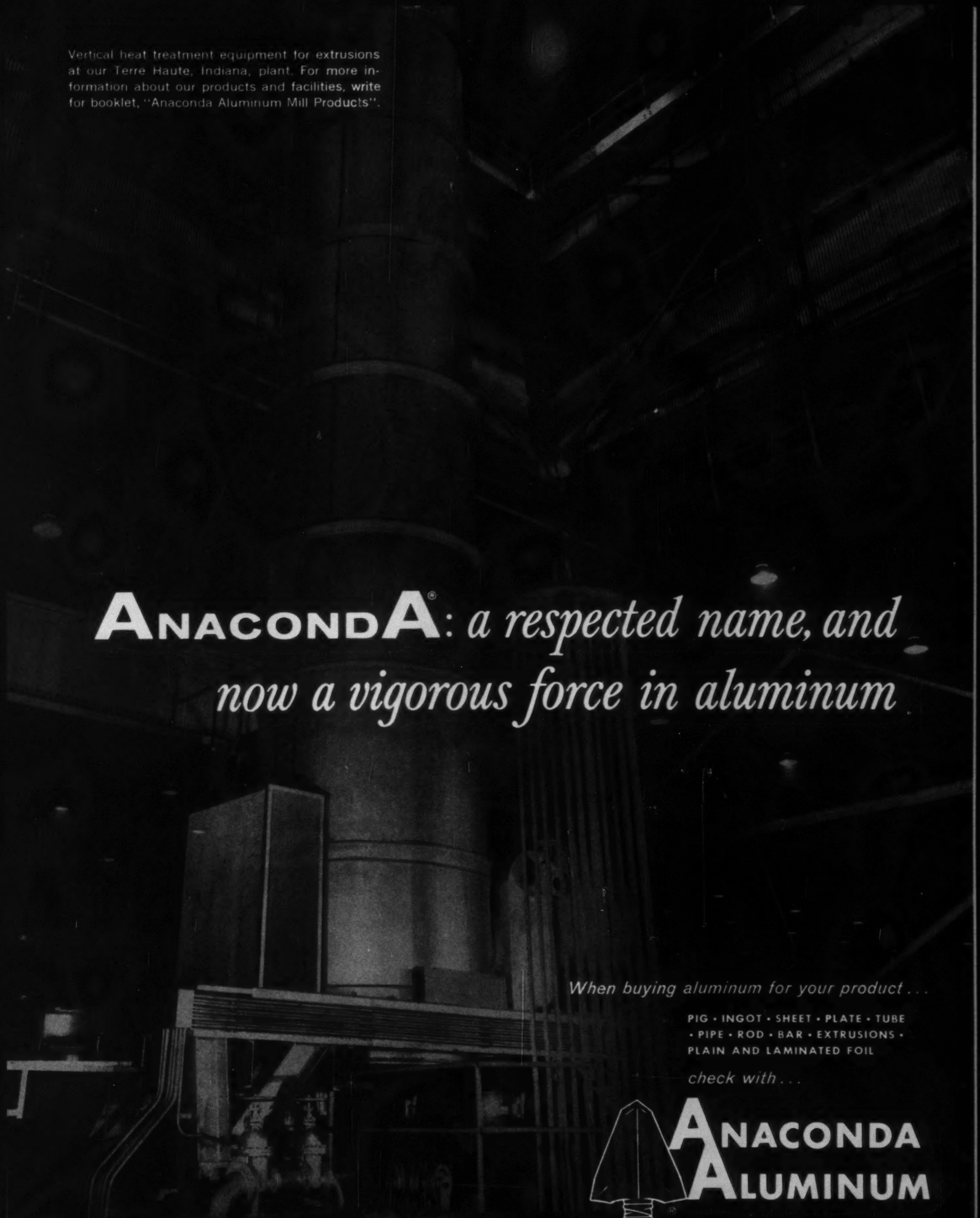

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Cedarapids

Cedarapids Super Commander Portable Crushing and Screening Plant, built by Iowa Manufacturing Company, Cedar Rapids, Iowa, produces up to 500 tons per hour of crushed and screened material in four different product sizes.

This high capacity V-Belt Drive handles

60% more power in 30% less space!

Higher Capacity of Gates Super HC V-Belt Drives solves complex product-development problem!

In developing a larger crusher, requiring more horsepower, Iowa Manufacturing Company was faced with the problem of transmitting 400 hp from a higher-speed engine in a space that had been just enough for conventional V-belts carrying 250 hp.

At the higher speeds, centrifugal force made it impossible to go to larger sheave diameters to accommodate larger belt sections. A wider span of belts was ruled out by Highway Department requirements, which restricted overall machine width to eight feet.

Iowa Manufacturing's designers solved their primary problem of transmitting 60% more horsepower with new Gates Super HC V-Belts.

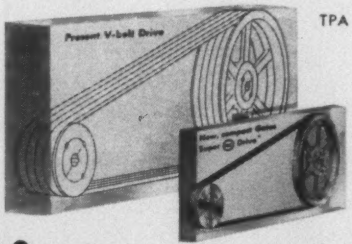
Because Super HC V-Belts have smaller cross section, use narrower and lighter-weight sheaves, pack higher hp capacity in a smaller 'package' than conventional V-belts, designers also succeeded in reducing drive weight, width and height — a decided bonus in equipment that must be moved frequently both on and off the highway.

Nation-Wide Engineering Service

There's a Gates Distributor nearby to show you how to reduce drive weight, space and cost with Super HC V-Belt Drives. With Super HC, sheave diameters can be reduced 30% to 50%, drive space up to 50%, and drive weight 20% or even more.

Ask your Gates Representative for your free copy of "The Modern Way to Design Multiple V-Belt Drives," or write to The Gates Rubber Company Sales Division, Inc., Denver, Colorado.

TPA 503A



The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates
World's Largest Maker of V-Belts

Gates Super HC V-Belt Drives

same hp capacity
in smaller "package"

P. L. Hotte, named president, Mallory Metallurgical Co., Div. of P. R. Mallory & Co. Inc.

Damascus Tube Co. — **R. R. Mills,** elected executive vice president.

Johnson Bronze Co.—**J. J. Brice,** named vice president, sales; **T. S. Acker,** named manufacturing manager, and **P. J. Failla,** named superintendent, machine shops.

Emerson Electric Manufacturing Co.—**L. W. Wightman,** appointed asst. to the vice president, operations.

The Lincoln Electric Co.—**A. F. Boucher,** named asst. general sales manager.

The Carpenter Steel Co., Alloy Tube Div.—**T. J. Bajoras,** appointed Pittsburgh area salesman.

A. O. Smith Corp., Electric Motor Div.—**R. T. Green,** appointed branch sales manager, Cleveland, O., sales office.

Industrial Equipment Div., Baldwin-Lima-Hamilton Corp. — **H. M. Klopfer,** appointed export sales manager, Loewy Products.

General Electric Co.—**R. J. Rodwell,** named manager, marketing, General Purpose Control Dept., Bloomington, Ill.

National-Standard Co., Reynolds Div. — **E. D. Weaver,** appointed plant manager, Cross Perforated Metals Plant.

Continental-Diamond Fibre Corp. —**T. R. Silk,** named manager, customer relations.

Kaiser Steel Corp.—**P. T. Bloodsworth,** appointed eastern sales manager.

Sperry Products Co., Div. of Howe Sound Co.—**R. C. Main,** named manager, engineering.

The New Jersey Zinc Co.—**R. W. Rosenquest,** promoted to manager, metal sales, Eastern Div., and **C. H. Prince,** to manager, technical service, Metal Div.

J. S. Randall, elected executive vice president, Kearney & Trecker Co., Milwaukee.

Norton Co.—**I. F. Williamson,** appointed superintendent, Santa Clara, Calif., plant.

Micro Metals Corp. — **R. C. Craig,** appointed sales manager and technical advisor.

Philco Corp.—**Dr. L. M. Hartman,** appointed associate director, research—operations.

Wheeling Steel Corp. — **C. D. Thurnes,** appointed asst. to the divisional superintendent, production, Benwood Works; **W. F. Williams,**

(Continued on P. 68)

F. J. Nunlist, appointed vice president, operations, Worthington Corp.

R. L. Smallman, named vice president, marketing, Servo Corp. of America.

Dr. D. W. Collier, named vice president, research, Borg - Warner Corp.

Hand coiling of small spring orders is a skilled operation at The Yost Superior Co. in Springfield, Ohio. The company uses Johnson Music Spring Wire exclusively. Here, worker coils .012 wire into a compression spring with 16 coils having an O.D. of .196 inch. Small orders are filled overnight in this department.

Johnson Wire Speeds Overnight Delivery Of Handmade Springs

A spring maker who built a flourishing business by filling small orders practically overnight uses Johnson Steel & Wire Company's Music Spring Wire exclusively.

President L. V. Barnes of The Yost Superior Company, Springfield, Ohio, says flatly:

"Johnson Music Spring Wire is best." Since 1924, when a merger of Superior Spring Co. and Yost Gearless Motor Co. formed The Yost Superior Co., the firm has concentrated on producing custom-made springs and wire forms.

In one day recently, five telephoned orders for small lots of springs all specified the quickest possible delivery. "Three of those orders went out the same day and the other two were shipped the next morning," said William H. Craig, secretary-treasurer who heads production and purchasing activities.

Three factors are all-important to Yost Superior. They are:

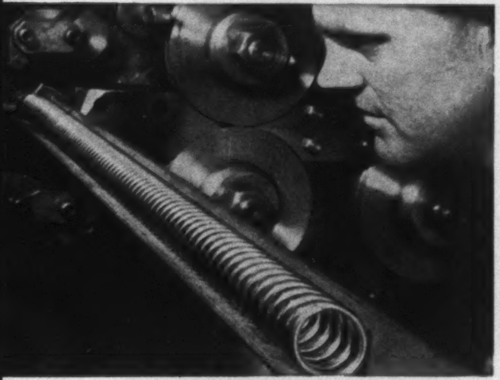
- **Spring Making Skill** — Yost Superior's bonus incentive plan, the long tenure of its employes and its steady growth for more than a half-century all demonstrate the company has a skilled work force which knows and practices the art of spring making.

- **Sizable Inventory**—Large wire stocks, usually running around 500 tons, are always on hand in Yost Superior's stock room. Mr. Craig said: "Our customers depend on us to supply their needs quickly. That means large stocks of wire sizes commonly used." He added:

"Johnson Music Spring Wire is so good—consistently—that we feel confident in laying in a large supply. We don't worry about quality varying from coil to coil or shipment to shipment. We can depend on wire we buy today to match the properties and performance of wire we bought a year ago.

"When we order from Johnson,

Electronic gager on this Torrington W10A Coiler measures to .005 inch in determining whether each spring coiled is the proper length. Springs rejected by the gager are blown to the side while good springs fall into container. Spring being coiled is made of .010 inch Johnson Music Spring Wire. It has an O.D. of .121 to .126 inch and is 5/16 inch long. It takes 1,000 springs to weigh a quarter pound.



Coiling a long spring on a Torrington W12A coiler from Johnson .120-inch diameter Music Spring Wire. The 95 coils in this spring measure 30-1/2 inches in length. Each coil has an O.D. of 1-1/16 inches.

we get quick delivery from warehouses in Akron or Chicago."

• Good Raw Materials — President Barnes said: "We demand the utmost in uniformity of diameters, finishes, tempers and physical properties. We get it from Johnson Steel & Wire Co.

"We don't have to ask for service. It's given us without asking. And Johnson Music Spring Wire has worked well for us. I would say their wire is the best. One hundred percent testing of finished springs proves it.

"We're accustomed to holding the diameter of springs — and often spring lengths — to tolerances stated in thousandth's, so we've got to have good wire. Johnson Music Spring Wire helps us meet specs and its performance helps us meet load requirements."

While Yost Superior makes springs in large production runs for everything from grass seed spreaders to missiles and rockets, its Hand Department is a key operation.

In the Hand Department where orders for less than 100 springs or wire forms are filled, Johnson Music Spring Wire proves itself.

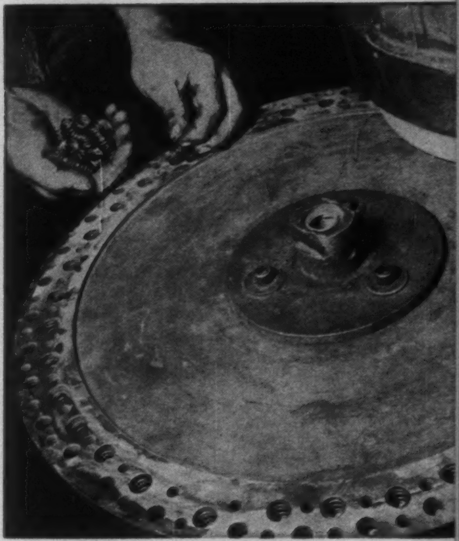
Coiling springs by hand means high labor costs so it's important to keep them down to a minimum or the cost of making a few springs would go sky high. Here cost of the wire is insignificant but quality of the wire is most important.

• Quality Comes Through — That's because there's little or no time for experimenting or trial runs. The Hand Department pays off because the spring maker knows his business and uses Johnson Steel Wire with its predictable performance qualities.

Yost Superior uses the full range of Johnson Music Spring Wire from .008 inch diameter up to .250 inch to make all kinds of compression, extension and torsion springs as well as a bewildering array of wire forms.

That's a good recommendation for any spring maker. Whatever your needs for Music Spring Wire or any other fine wire specialty, you can count on Johnson Steel & Wire Co. to give you the same consistent quality and good service which pleases Yost Superior.

You can get better wire and better products, starting today. Just call the nearest district sales office, listed here, and talk to a Johnson man who knows wire and production problems.



Grinding of spring ends on a Besly Grinder. These compression springs, made of .047 inch O.D. Johnson Music Spring Wire, are only 9/16 inch long and have an O.D. of 13/32 inch. On this machine, the closed ends are being ground square.

Coils of Johnson Music Spring Wire are delivered to the Coiling Department from Yost Superior's large stock room. The company normally carries an inventory of about 500 tons of wire.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

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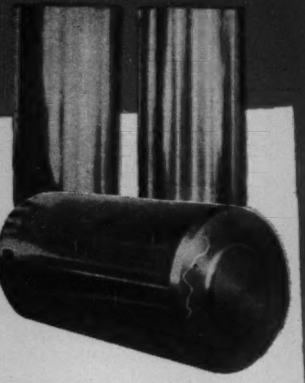

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Hyde Park Rams are available in Chilled or Alloy Iron.

Furnished in hardness range to meet your specification . . . ground to your required size.

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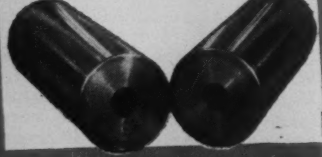

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FOUNDRY and
MACHINE CO.
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Rolls
Rolling Mill Equipment
Gray Iron Castings

(Continued from P. 65)

appointed superintendent, finishing, warehousing and shipping.

LeTourneau-Westinghouse Co.—**L. A. Rager,** appointed manager, Products Marketing Dept.

C. A. Hathaway, appointed vice president, Torrington Manufacturing Co., Torrington, Conn.

Clearing Div., U. S. Industries, Inc.—**Boyd Holm,** appointed general manager, Die Div.

The Budd Co., Instruments Div. —**R. E. Love,** appointed marketing manager.

Loftus Engineering Corp.—**C. F. Brown,** appointed purchasing agent.

Young Spring & Wire Corp.—**R. E. Parrett,** appointed corporate director, manufacturing.

F. A. Ryder, elected a vice president, Stewart-Warner Corp., Chicago.

J. C. Laegeler, appointed vice president, engineering, The Frank G. Hough Co., Libertyville, Ill.

Thompson Ramo Wooldridge Inc.—**A. E. Stukey,** named manager, new Standards Dept., and **Harley King,** named manager, manufacturing controls.

Pittsburgh Metals Fabricating Co. Warehouse Div.—**S. E. Dunlap,** appointed general manager.

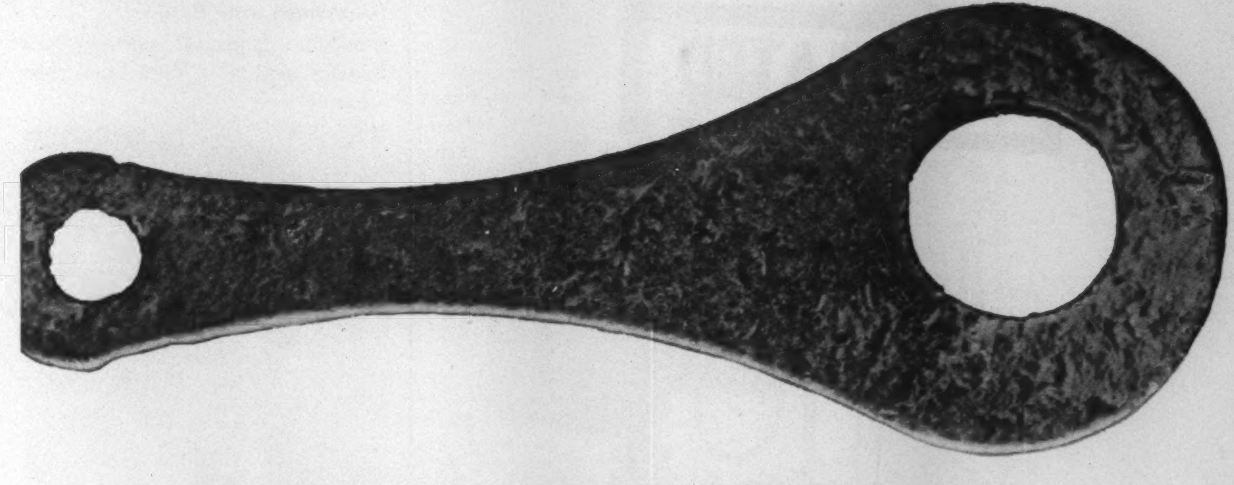
Metal Div., Continental Can Co. —**J. W. Broomhead,** appointed general manager, production planning.

H. G. Shackle, appointed secretary, E. W. Bliss Co.

Luria Bros. & Co., Inc.—**A. C. Schiff,** named an account executive in the company's Alloys and Nonferrous Metal Dept., New York.

Waterbury Rolling Mills Inc.—**D. L. Burnham,** promoted to dis-

(Continued on P. 70)



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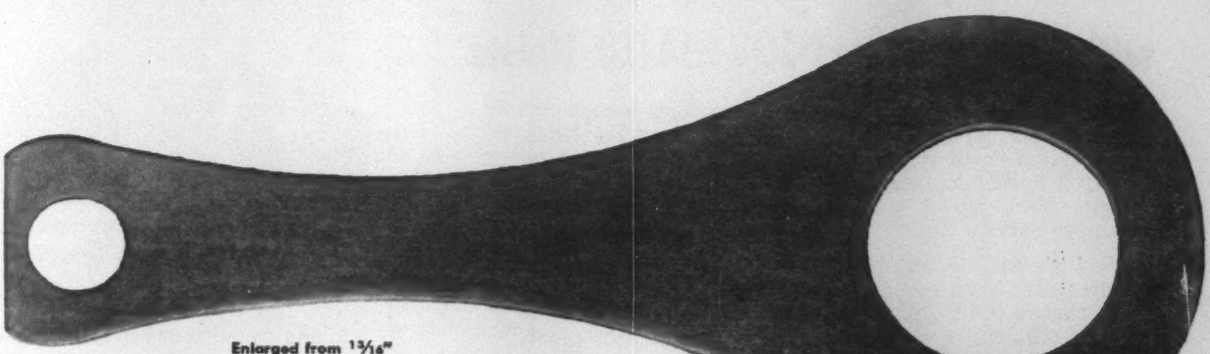

Enlarged from $1\frac{3}{16}$"

Profitable strip products or expensive rejects . . . the difference is *how* your alloy was cast. *Exclusive* Riverside-Alloy *continuous casting* methods produces the ideal metal . . . no impurities, no gas holes . . . but a dense, homogeneous casting, 100 per cent fault-free.

Result: Riverside-Alloy strip, rolled from Riverside-Alloy castings, is the finest you can buy . . . never a hidden defect to show up in thin gauges, under severe die forming.

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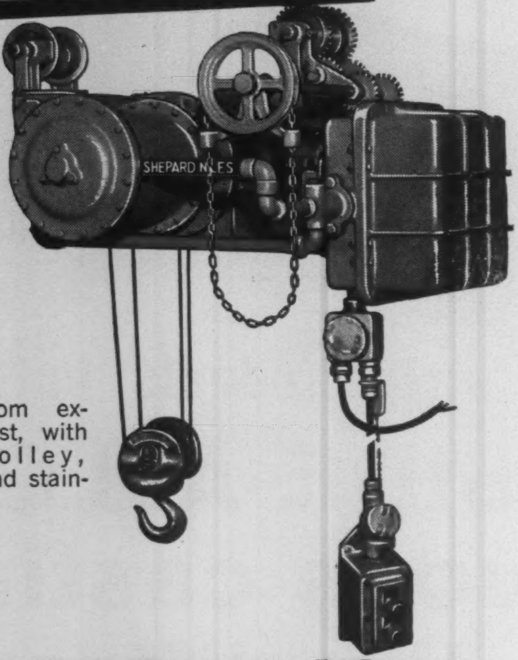
JOB-MATED



Close head room explosion-proof hoist, with hand geared trolley, bronze wheels and stainless steel tackle.

Give profits a lift...

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It's the exact combination of capacity, clearance, speed and controls that makes this Shepard Niles Explosion Proof Hoist exactly right for your particular job. A hoist accurately matched to the job cuts handling costs, moves more materials faster, and gives longer service life.

And it's easy to match precise job conditions at Shepard Niles. With thousands of types and sizes of hoists to choose from, you are sure to find the **right** hoist for truly efficient, economical performance in your plant.

You have your choice of ¼-ton to 20-ton capacities; of floor or cab controls; motor-driven or hand-operated trolleys; regular or long lifts; and regular or close clearances. Whatever combination you choose, you get the quality construction and advanced engineering that have made Shepard Niles America's largest manufacturer of hoists and cranes.

For complete details on Shepard Niles **"Job-Mated"** hoists, write for a descriptive bulletin, or ask a Shepard Niles representative to call.

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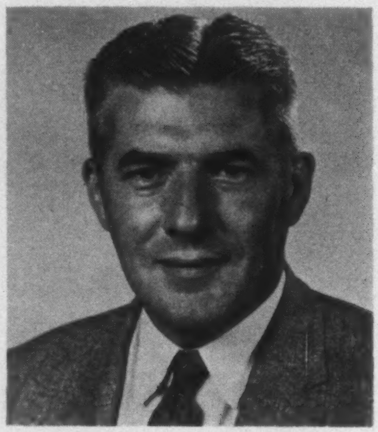
1408 Schuyler Ave., Montour Falls, N.Y., U.S.A.

(Continued from P. 68)

trict sales manager, southern New England and New York State sales area.



Clark Nichols, named manager, Systems Engineering Div., Leeds & Northrup Co., Philadelphia.

E. F. Hill, promoted to director, new products, Wolverine Tube, Div. of Calumet & Hecla, Inc.

Eaton Manufacturing Co., Marion Div.—**R. A. Wieland, Jr.,** named factory manager; **C. D. Barnes,** appointed divisional sales manager; **A. J. Zahn,** named personnel director; **S. J. Rog,** has joined the division as an industrial engineer.

"POP" Rivet Div., United Shoe Machinery Corp.—**J. H. Schofield,** appointed product sales manager, for "POP" Rivets at Shelton, Conn.

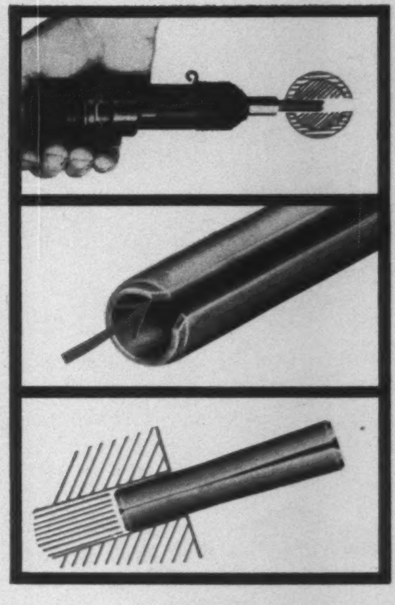
The Hickok Electrical Instrument Co., Meter and Controls Div.—**Harry Turkington,** named director, engineering, and **Hal Moore,** promoted to chief meter engineer.

Rollpin won't mushroom or telescope

There are no installation or removal problems with Rollpins. Because of their column strength they can be readily driven with a hammer, removed with a punch without bending or collapsing. Of course production line tooling such as an arbor press, a pneumatic hammer . . . even a hand riveter . . . is ideal for Rollpin insertion.

Rollpin won't damage or enlarge hole

With smoothly chamfered ends providing an easy lead-in, Rollpin is compressed into complete conformity with the shape of the hole. The exclusive, v-shaped, coped corner design eliminates possibility of damage to the hole walls. They prevent any possible scoring action as the pin is driven and insures uniform insertion and removal characteristics. The benefit to you: the same pin can be reused in the same hole.



ONLY ROLLPIN OVERCOMES ALL THESE FASTENING PROBLEMS!

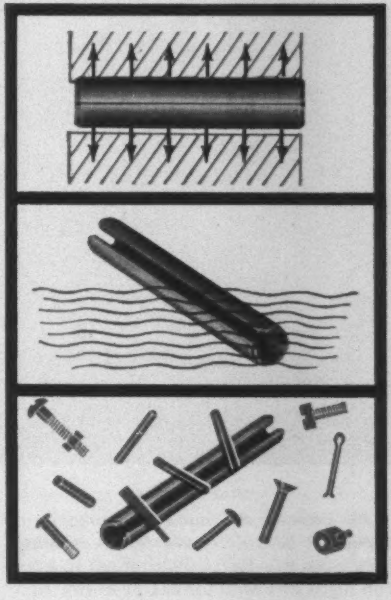
Rollpin exerts EVEN pressure

In some fasteners, only a portion of the fastener shaft does the actual holding. Rollpin, however, exerts a uniform pressure around the entire inside surface of the hole—giving you maximum holding power and superior resistance to vibration.

Split tubular construction assures uniformity of heat treatment that is difficult to obtain with spiral types of pins; there is an even plating "throw" inside the pin as well as outside for superior corrosion protection.

ONE TYPE of Rollpin does EVERY TYPE of job

Versatile Rollpins will replace at least 12 different types of fasteners. Every Rollpin can be hopper-fed, can be installed with a single operation. They are available, from stock, in a wide range of lengths and in diameters from 1/16" to 1/2". Manufactured from carbon or corrosion resistant steels and beryllium copper.



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WHERE CAN YOU USE THIS VERSATILE FASTENER? MAIL COUPON FOR SAMPLES:

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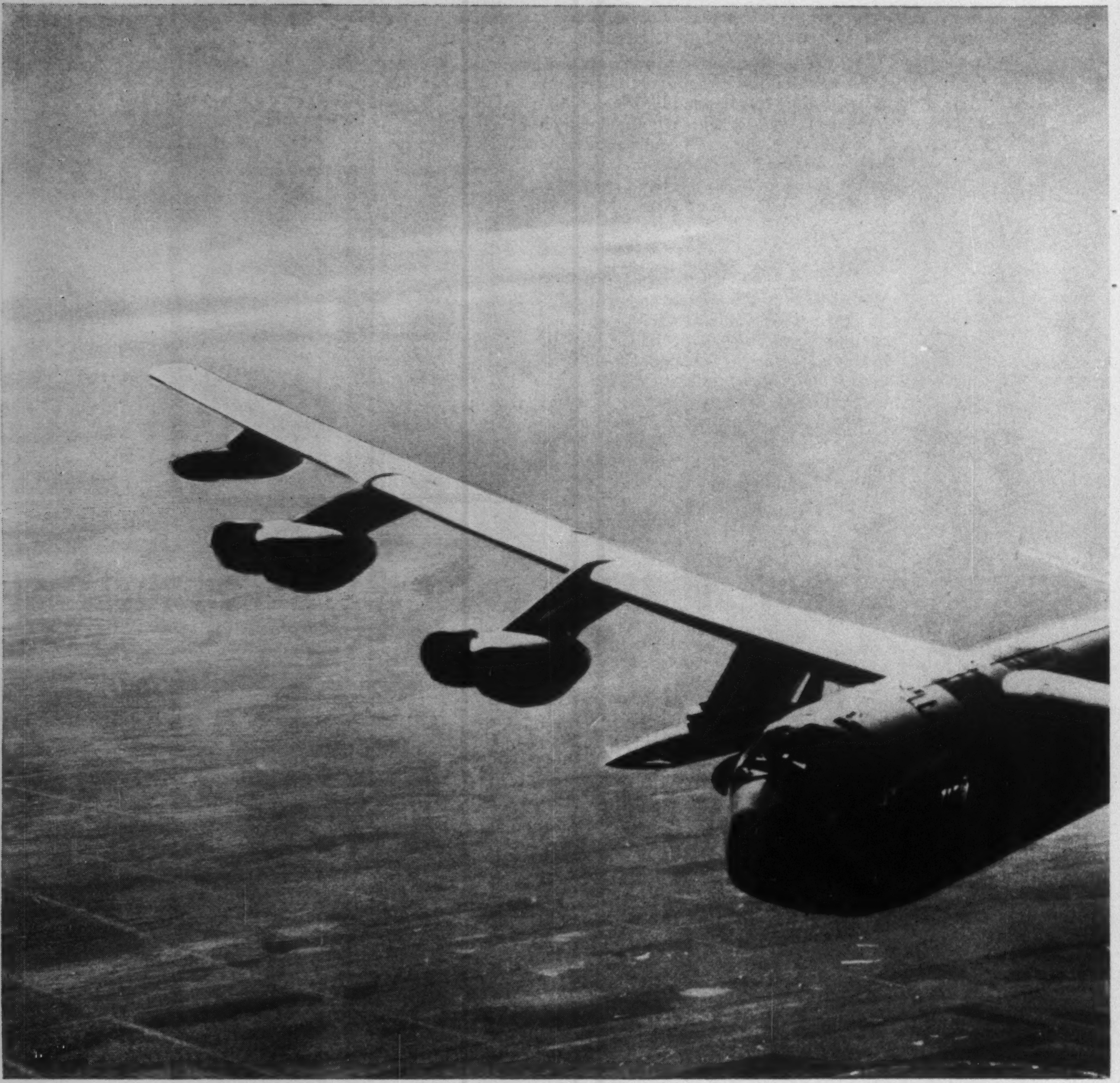


The BOEING B-52G triple-threat nuclear bomber — a major weapon in the current SAC deterrent force—recently carried two big missiles over the North Pole on a 10,800-mile nonstop flight. The flight was another example of a successful effort by the SAC-industry team to provide constant refinement and maintenance of the Strategic Air Command's "big stick" fleet of heavy and medium jet bombers. Designed originally as a platform bomber, the B-52G can now carry, in addition to its bomb load, two North American "Hound Dog" GAM 77 missiles capable of tracking down targets hundreds of miles from their launching point. This makes it possible for the big ship to strike at three entirely separate targets in one raid. The B-52G transports a gross weight of nearly half a million pounds, and Alcoa® Extrusions help carry the load.

Now included in the main wing section are 75-ft extruded 7178-T6 Alcoa Aluminum alloy panels which make possible fuel storage in nearly the whole in-spar area (out to the external underwing fuel tanks). The external fuel tanks provide still additional range.

By shaving some 10,000 lb from the previous model, the B-52G range is increased by about 6 per cent . . . a weight saving accomplished mainly by a redesign of the wing structure. Boeing engineers greatly increased interior fuel storage, replaced fuel bags with an integral wing configuration.

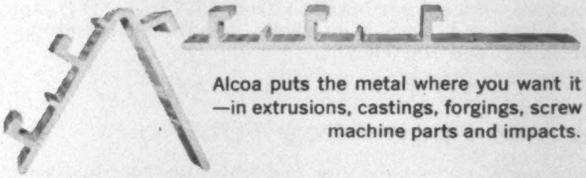
Alcoa Extrusions—in widths up to 35½ in.—are actually extruded for the B-52G in the "V" shape (pictured at right) on one of Alcoa's 14,000-ton extrusion presses. They are then cold rolled into the flattened cross section. The part is sent to Goodyear Aircraft Corporation, Litchfield Park, Ariz., for machining and assembling into a portion of the center wing section. Goodyear, in turn, ships the completed unit to Boeing Airplane Company, Wichita, Kan., for installation in the airplane. Extensive machining, riveting and assembly operations are eliminated by the use of these large extrusions—and the required strength is obtained with less weight than would be

HOW TO
CARRY
A
"BIG STICK"
10,800
MILES!

necessary if the wide section were built up from smaller pieces.

Mammoth presses are only a part of the story. Complex auxiliary equipment, including a 120-ft-long stretcher (with **3,000,000-lb** pulling force), roll straighteners and detwisters, enables Alcoa to extrude shapes that put the metal where it is wanted! With this extrusion equipment, Alcoa can produce closed-end containers up to 44 in. in diameter, stepped or other type extrusions up to 2,500 lb total weight, extrusions up to 39 in. in width, tubing of uniform or variable wall up to 19½ in. inside diameter. In addition to aircraft and other defense applications, large shapes extruded by Alcoa find uses in the electrical industry, pipelines, truck, bus, trailer, ship and architectural construction.

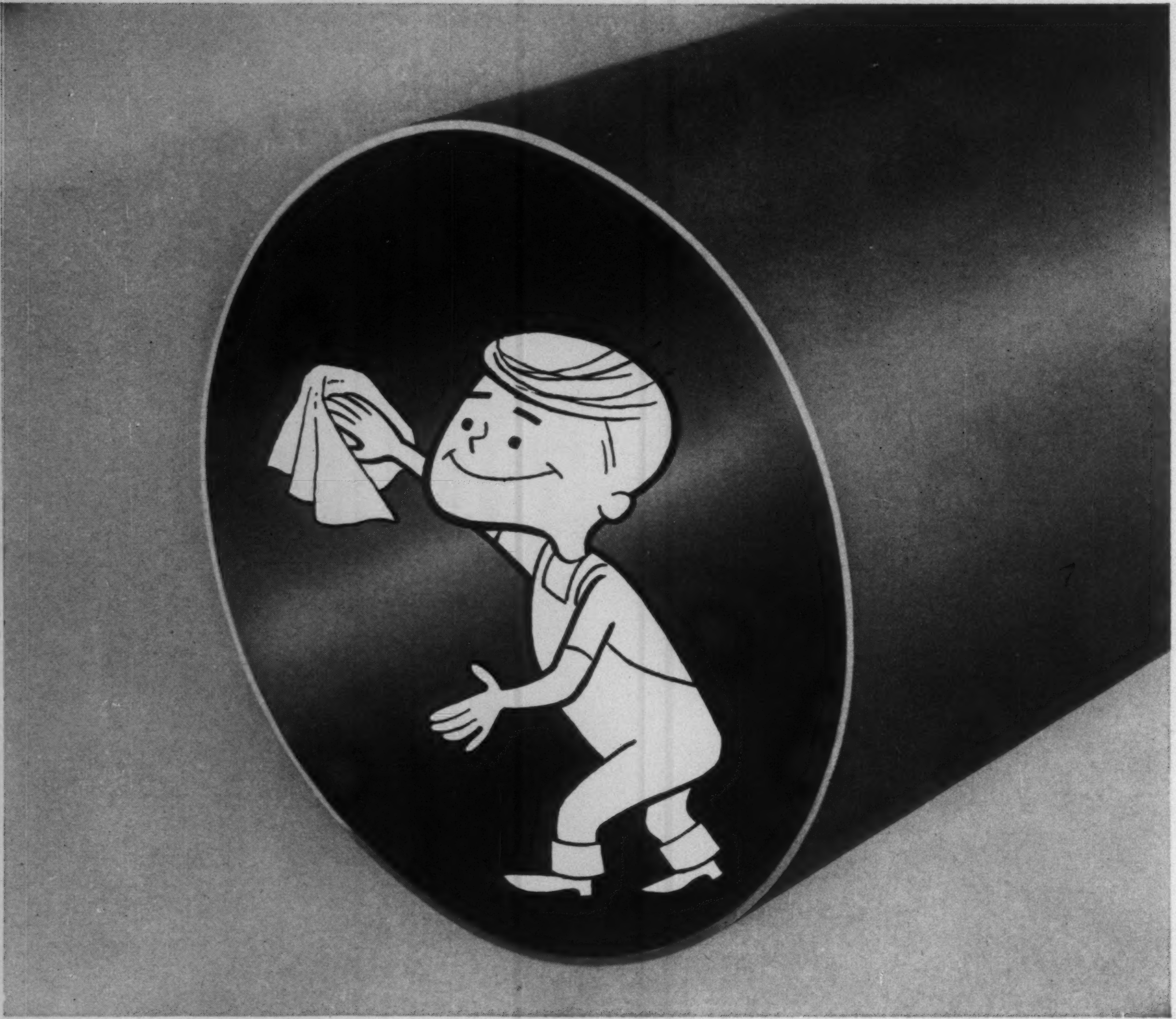
For more information, write Aluminum Company of America, 907-L Alcoa Bldg., Pittsburgh 19, Pa. World-wide sales through Alcoa International, Inc., 230 Park Avenue, New York 17, N.Y.



Alcoa puts the metal where you want it —in extrusions, castings, forgings, screw machine parts and impacts.

ALCOA ALUMINUM

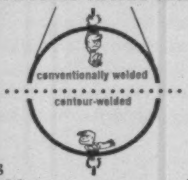
ALUMINUM COMPANY OF AMERICA



"The Gravity Kid" shows how

YOU CAN STOP CONTAMINATION WITH THE HELP OF CONTOUR-WELDED STAINLESS TUBING

In tubing, surfaces that are microscopically rough and ragged can cause contamination—simply because of the product becoming incrustated. Contour-welded tubing helps lick this problem because it's smoother inside than any other tubing, welded or seamless.



This smooth surface is the result of Contour-welding, a patented* process that eliminates the weld bead. Unlike conventionally-welded tubing, it's welded at the bottom. Gravity pulls the molten metal down so that the weld area corresponds to the inside contour of the tube. There's no bulge on the inside surface. Even on the outside, the seam closely conforms to the tubing shape.

In conventionally-welded tubing, gravity pulls the molten metal down into the tube, forming a bead that is difficult to remove by cold working. And cold working can lead to undercuts that become focal points for incrustation.

Even seamless tubing isn't as smooth as Contour-welded tubing. That's because it's extruded or pierced, whereas Contour-welded tubing is formed from uniformly rolled strip steel.

But see for yourself. Write today for our free 48-page manual, which describes sizes from 1/8" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy, and Hastelloy**.

* U.S. Patent 2,716,692

**Trademark Haynes Stellite Co.

TRENTWELD® Stainless and High Alloy Tubing

Trent Tube Company, a Subsidiary of Crucible Steel Company of America, General Offices and Mills: East Troy, Wisc.; Fullerton, Calif.

How Strong at 23,000° F?

Missile re-entry bodies must withstand heats that are hotter than the sun's surface. What happens when materials are exposed to temperatures ranging from 2000°-23,000°F and gas velocities of 3000-16,000 fps? An Aerojet-General research team will soon analyze the physical and chemical changes that occur. Results will establish a mathematical guide to predict behavior.

Solves Bearing Problem

Demands of powerful turbo-jet and turbo-prop engines are taxing the ability of standard bearing steels. To improve this situation, SKF Industries, Inc. has developed a new line of high-hot-strength steels for bearings. One operates continuously up to 600°F. Another is slated for continuous service at 1000°F. They also withstand speeds of 10,000 rpm.

Needed: Greater Precision

Accurate temperature and linear measurements are vital to any space program. One millionth of an inch spells the difference between a successful space probe and a complete miss. To further knowledge in standard measurements, George Washington University has started an Institute of Measurement Science.

Calls for New Policy

Lack of funds for making and testing aerospace equipment worries manufacturers. The cost of building new facilities has taxed the aerospace industries to the limits of its finances. Gen. O. R. Cook, president, of the Aerospace Industries Assn. believes a more equitable government policy on facilities investment should be drawn up.

Offers Rockets at Cost

Companies interested in sending up space satellites for global communications can get a helping hand from the government. The National Aeronautics and Space Administration will make rockets and launching facilities available at cost for space communication projects. It's expected that AT&T, which plans to put the first private satellite in space within the year, will take advantage of this offer.

Extends Polaris R & D

The Navy is apparently enthused over Polaris test results. It recently awarded a $181 million contract for research and development of longer range fleet ballistic missiles to Lockheed Missiles and Space Div. This brings the total funds, awarded to Lockheed in the Polaris program, up to $608 million.

Small-Plane Sales to Rise

By 1970, business aircraft sales will show a 50 pct increase over current production figures. So predicts GE engine-project manager, J. N. Krebs. Market studies, he says, show the beginning of a strong upward surge in demand for small and intermediate-size business aircraft. Sales are expected to climb from the 8000-unit figure of last year to 12,000 units a year by 1970.

Chopped Wires Stop Jets

Chopped wire bits help jet planes, landing at 250 mph, roll to smooth stops. Brass-plated carbon-steel wires, about twice the thickness of human hair, are molded into the aircraft tires. These wires double the life of the tires. They protect the tread from being cut and permit the use of thin, lightweight treads.

Must Withstand −423°F

Increasing use of liquid-gas propellants points to the need for high-strength structural alloys for service at −423°F. In addition to a high strength/density ratio, these alloys must be tough and weldable. Prospects include cold-rolled austenitic stainless steels, certain aluminum alloys, and alpha-titanium alloys.

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This new spring wire, upholstery grade, solves stress-relieving problems ◎ With Roebling Springkote Wire, burned-out electrical contacts and uneven heat distribution are problems of the past ◎ Springkote Wire paints better and runs smoother through coiling and knotting machines. All this for the same price as wire with the standard lime coat ◎ We don't mean to imply that lime-coated wire has faded into obscurity ◎ We're glad to supply it ◎ But we do urge you to look into the advantages of Roebling Springkote ◎ Customers who have run trial lots have been convinced and have switched to Springkote Wire for all their needs ◎ You can get the details by writing to Wire and Cold Rolled Steel Products, John A. Roebling's Sons Division, Trenton 2, New Jersey ◎

**Reg. App. for*

WIRE

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ACTS A LOT BETTER**

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Electroshaping: New Process Speeds Metal Removal

By **C. L. Faust**—Chief, Electrochemical Eng., Battelle Memorial Institute, Columbus, O., and **C. A. Snavely**—General Manager, Sifco Metachemical, Inc., Cleveland

It never fails. When ultra-close tolerances are critical, twist, bow and warp add to the task of working with hard metals.

A new shaping process solves the problem by machining with electric current.

▪ Today's very hard and very tough space-age metals require new metalworking techniques.

One answer to the problem is a new process that is not dependent upon metal hardness. Developed by Battelle Memorial Institute, in research sponsored by The Steel Improvement and Forge Co., the new process shapes parts in as little as one-tenth the time of standard machine tools.

The new process differs from others which use the electrolytic metal removal principle. Electroshaping can produce complete parts in addition to sinking cavities; it uses no rotating cutting wheels; a simple rectifier supplies the power.

Atom by Atom—Familiar ways of shaping materials do so by chip removal. Electroshaping, however, uses electrical energy to dislodge the surface atoms of the metal. They are swept away by a rapid and controlled flow of a chemical solution. Thus, an atom-by-atom process replaces chip-by-chip removal.

To produce a part, the workpiece is connected to the positive terminal of a direct-current source. Specially shaped electrodes are hooked up to the negative side. An electrolyte, pumped between the workpiece and electrodes, closes the circuit. Workpiece, electrodes, and electrolyte are all contained in a plastic chamber.

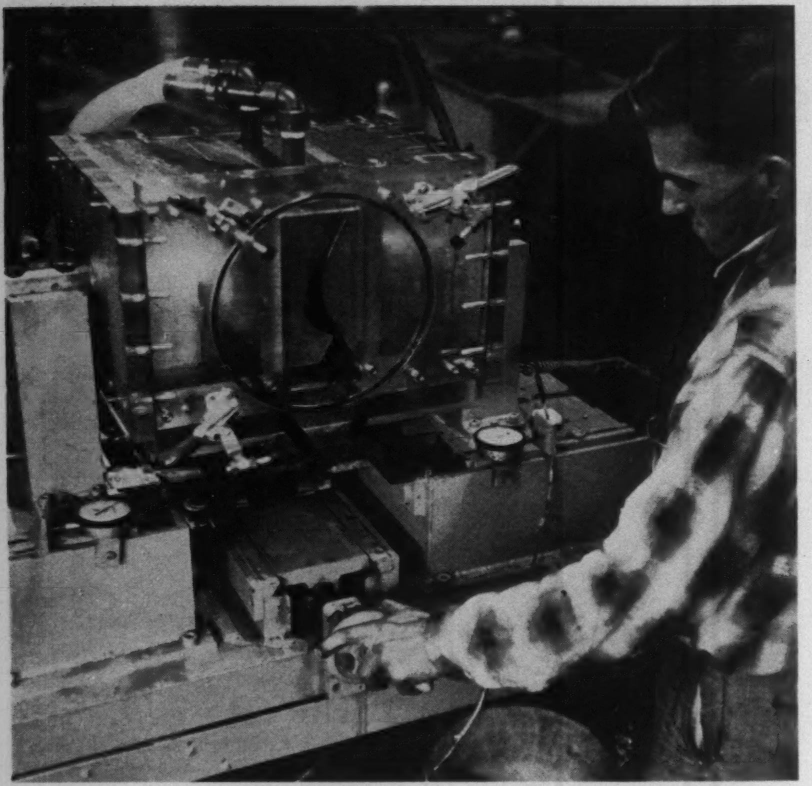
Portrays Current Flow — The drawing on page 79 points up the theory behind the process. Current flow between the metal workpiece and the other conductor is represented by lines. The greatest density of lines means the greatest density of current.

More material is removed at points of greatest current flow. Speed of metal removal depends upon the increase in direct current per unit of area.

This rule applies as long as the solution can supply the reactants to carry away the metal at the rate it's being dislodged. The rate of electroshaping also matches the speed at which the dislodged metal atoms in solution diffuse away from the metal surface.

Limits Current Flow—Such diffusion is a slow process and limits current flow to about 2-3 amperes per sq in. This corresponds to removing 0.00027-0.0004 in. of metal per sq in. per minute—too slow

CONTROLS CONTOUR: C. L. Faust and C. A. Snavely discuss success in electroshaping forging into turbine blades having close contours.



ELECTRODES CLOSE GAP: Electrodes, shaped to the desired contour, can be moved together so that forging is "worked in" to its final shape.

for sawing a billet, grinding, or shaping surfaces. The rate should be 200-500 times faster for practical metalworking needs.

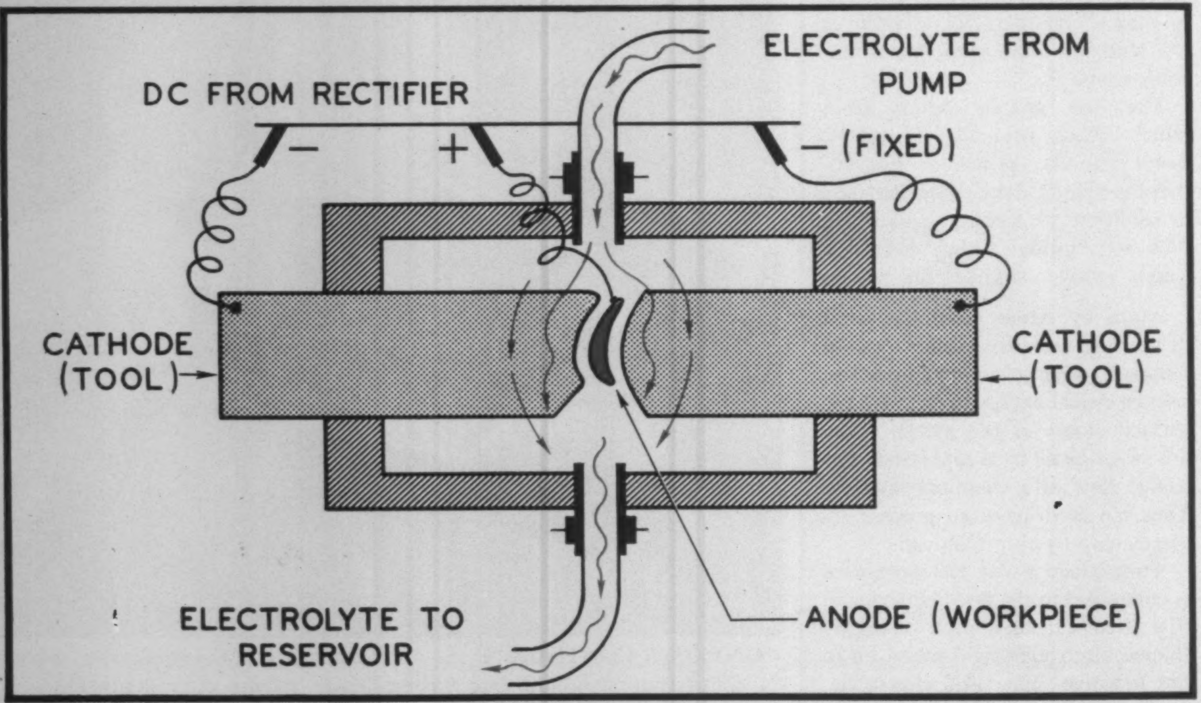
The maximum amperage that can be conducted into the metal without boiling the solution limits the rate of metal removal. The chemical solution of most importance to electroshaping is a film about 0.003-0.005 in. at the metal surface. The dislodged metal enters this film. It, in turn, must be removed and replaced with a fresh film at a high rate.

Achieving this higher rate are special fixture designs that rapidly exchange the used chemical solution. Now, a current flow up to 1500 amperes per sq in. is possible —200-500 amperes being most generally used. Metal removal is now at rates of 0.05-0.1 ipm.

The net effect is to direct control of the electroshaping process. Now a metal can be converted into a desired shape.

Gives Desired Shape—At first, most of the current flows through

No Tool Wear: Electric Current Machines Metals



the paths of least resistance—the high points on the cathode as shown in the drawing. At the finish, there is equal current density at all points. This is the result of metal being removed to give corresponding depressions on the anode.

The electroshaping process offers a number of advantages. One of the greatest is its simplicity. Another is its fairly simple power source. Others include: no tool wear; use of standard semi-automatic feed devices; the ease with which operators can be trained.

There are other significant features to the new process. The lack of physical contact means that there's no pressure on the workpiece. Result: ultrathin metals are electroshaped as easily as heavy sections.

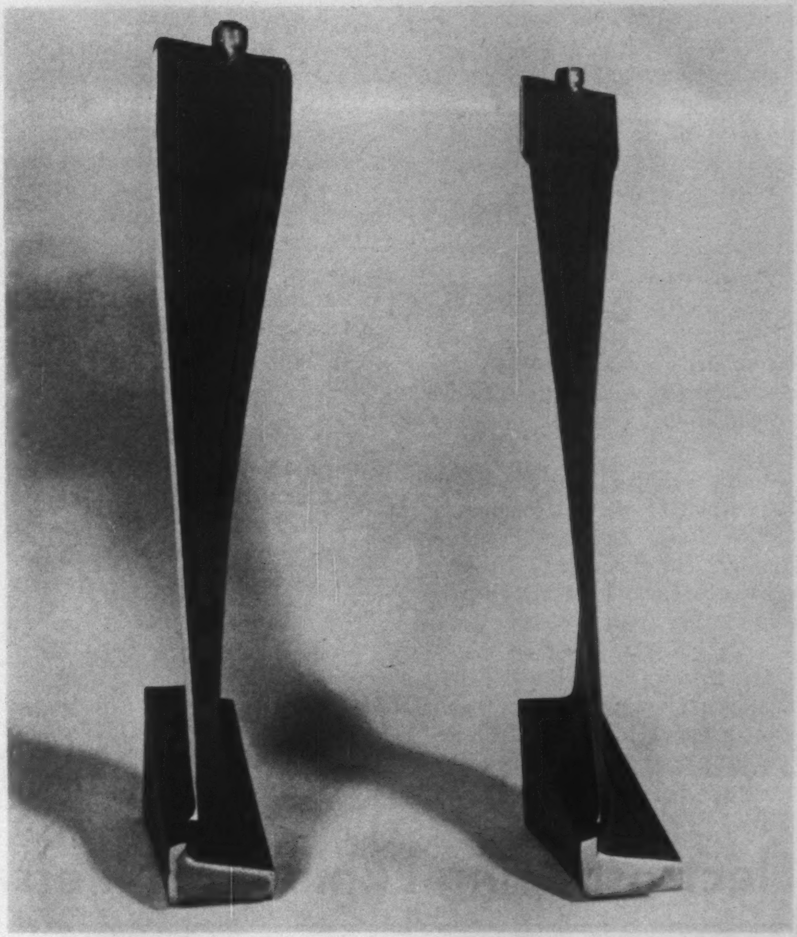
Tied up with the absence of pressure are these aspects. There are no burrs at cut edges. Hence, there are no deburring costs, and no burrs at inaccessible points. The operation is noiseless; there are no sparks, chatter, crunch, or dust.

Speeds Machining—The unit has machined rough-forged jet turbine blades to 0.003-in. tolerances in 5-10 minutes. This operation took from 1-2 hr to perform by grinding.

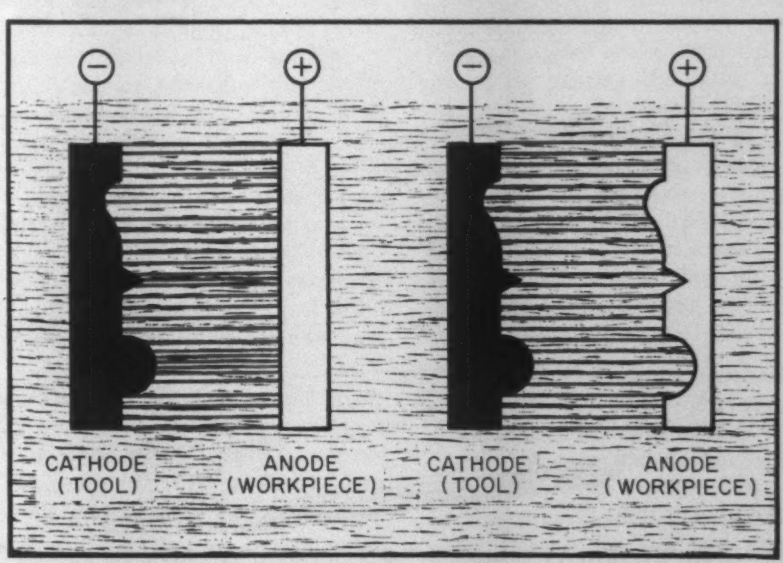
Making turbine and compressor blades for jet engines has always been a great challenge to the metal fabricator. Thus, it's interesting to note that several of the new machines have been operating on a production basis for a number of months. More than 15,000 jet engine compressor blades of 16 different designs have been made. Leading and trailing edges are as thin as 0.005 in.

The approach, followed at Steel Improvement up to now, is to produce a slightly oversize forging—thus leaving a band of material for later removal.

Long Die Life—This permits the use of much wider dimensional tolerances on the forging and also results in greater die life. Inspection



BEFORE AND AFTER: The turbine blade on the left is in the as-forged condition. Its mate has been electroshaped to finish dimensions. Leading and trailing edges have been shaped as thin as 0.005 in.



DENSITY VARIES: At start of run current density varies along tool and workpiece (left). After metal is removed, current density is equal.

of the forged product is greatly reduced as compared to that for precision forging.

While work to date has been confined to electroshaping of forged workpieces, the new process can be applied to castings or bar stock. The overall tooling cost is low; reproduction is excellent; contour control is good.

The process is now at the point where tooling can also be produced by similar techniques. Potentially, electroshaping is able to duplicate all the common metalworking operations.

Internal shaping, the electrolytic counterpart of internal grinding or turning is one. Depending on size, contour, and material, the finished workpiece could be anything from a rocket nozzle to a carbide drawing die. The die might be shaped to rough oversize dimensions by usual powder metallurgy techniques. Electroshaping then gives it a finish contour.

Provides Accuracy — Milling or grinding by the Sifco method results in accurate surfaces, slots or grooves. It provides dimensional accuracy over long lengths such as in machine tool ways. Lack of tool wear or distortion of the work by heat are important aspects.

An electrolytic cutoff is another application. It's similar to abrasive cutoff or circular sawing as applied to large billets, 5-20 in. and over. Fully hardened steels can be cut without surface damage or overheating.

The unique feature of this no-contact shaping method is the number of cutoff wheels that can be set on a single arbor. A billet can be cut into a number of pieces in one pass. And using thin cutting disks saves costly metals.

Drills Complex Shapes — Deep hole drilling is a fairly simple job for electroshaping. The hole can be round, square, fluted or of other complex shapes. A multiple hole drilling operation is also possible. This technique might be used to make tube sheets for heat exchangers.

The process also gives designers wide latitude in the choice of metal shapes and materials which can be economically worked. Materials that are being shaped include: stainless steels, hot-work tool steels, tungsten, and molybdenum.

While electroshaping is new, the progress made to date is very encouraging. Superior surface finishes are being constantly obtained. Stress problems are a thing of the past. Warp, bow and twist tolerances have been drastically reduced.

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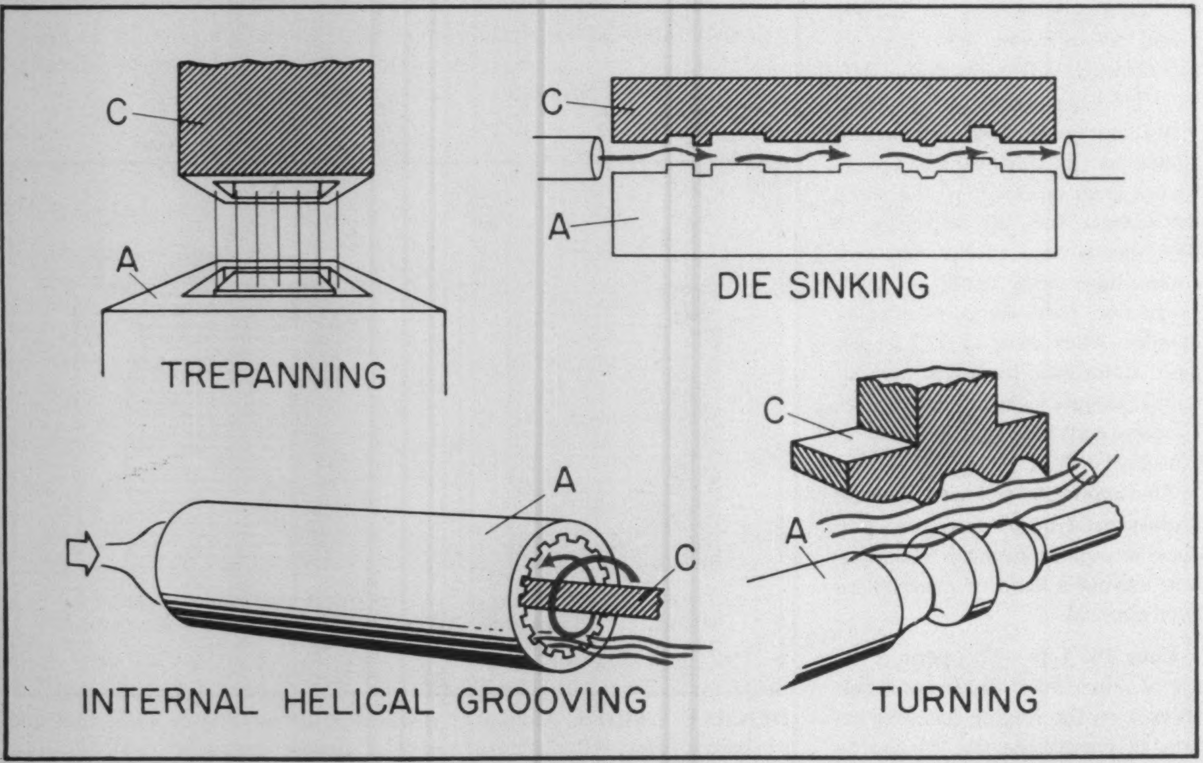
Electroshaping Exhibits Its Versatility



TV SHOWS SCALE: With the aid of the new TV monitor, the shearman can cut blooms within ±0.125 in.

TV Measures Beams in Hot Mill

A wider TV screen fills the eyes' desire to see more.

It also fills the bill at steel mills where the desire is greater shearing precision.

▪ The wide screen of the show world also fits in as a useful tool in the steel industry. The new screen accurately measures shear lengths of I-beam and wide-flange blanks as they emerge red hot from the blooming mill stands.

With this new system shearmen at Bethlehem Steel Company's Saucon Div., Bethlehem, have improved their accuracy with less physical effort. The result: better product control.

From an air-conditioned pulpit overlooking the rolling mill, the shearman now watches a televised view of the glowing bloom. As it passes through a down-cut shear, the operator can chop the bloom anywhere from 12-36 ft long with extreme precision.

Natural View—The wide screen image gives a more natural proportion in the horizontal axis. The vertical four-by-three ratio used in standard television does not offer enough lateral width for fine-scale mill uses.

This new system of closed-circuit TV combines an optical pattern on a video screen which has been electronically "unsqueezed."

A four-by-three aspect is opened to a seven-by-three aspect ratio. The change in screen yields 75 pct more information.

How it Works—An optical-size scale is superimposed on the televised picture of the section being rolled. By reading the scale, the operator can control shear lengths from 12-36 ft within ±0.125 in.

The TV camera views, through a system of prisms and lenses, an illuminated scale and the 1800° beam blank moving along the roller bed. The scale shows graduations to an ⅛ in. and can be adjusted to a hair line on the picture tube.

Cuts Hot Beam—The shearman controlling the rollers watches the televised picture of the red hot beam rolling out from the blooming mill. As the clean end of the blank lines up with the hair line, the operator triggers the downcut shear making the cut to exactly the desired length.

Descale Steel for Closer Check

Mechanical Blaster Brings Flaws Into Focus

Scrap losses near the finished product point hurt profits right down the line.

One way to guard against flaws in the raw material is to blast descale stock prior to inspection.

▪ Most steel producers are aware of the cost in time, money, and material that occurs when defects are not found in the early production stages of slabs, billets and bars.

The scrap losses or recovery costs become progressively higher as defects such as fine seams and cracks move closer to the finished product. Therefore, the need becomes apparent for an economical and positive method of descaling prior to inspection.

Such descaling methods must produce a surface easy to look at, with sufficient contrast between the defect and the sound metal surface.

Basic Idea—How can this be done? One answer comes from Wheelabrator Corp., Mishawaka, Ind. It's mechanical blast descaling. Basically, the process is the same as that used by scores of other industries to clean and finish metal products.

Steel abrasives bombard the steel surface, freeing it of scale. The abrasives are propelled in a controlled pattern by the centrifugal force of one or more rapidly-rotating blast wheels.

After the abrasive strikes the steel, the mixture of abrasive and scale circulates through a recleaning system. Here, worn abrasive material and scale are separated. Only effective abrasive returns to the blast wheels for re-use.

Several Advantages—Many prominent producers use mechanical-blast systems to clean such materials as carbon steel, stainless steel, tool steel, zirconium, and titanium products prior to inspection. This places the companies in a good position to comment on the system's advantages.

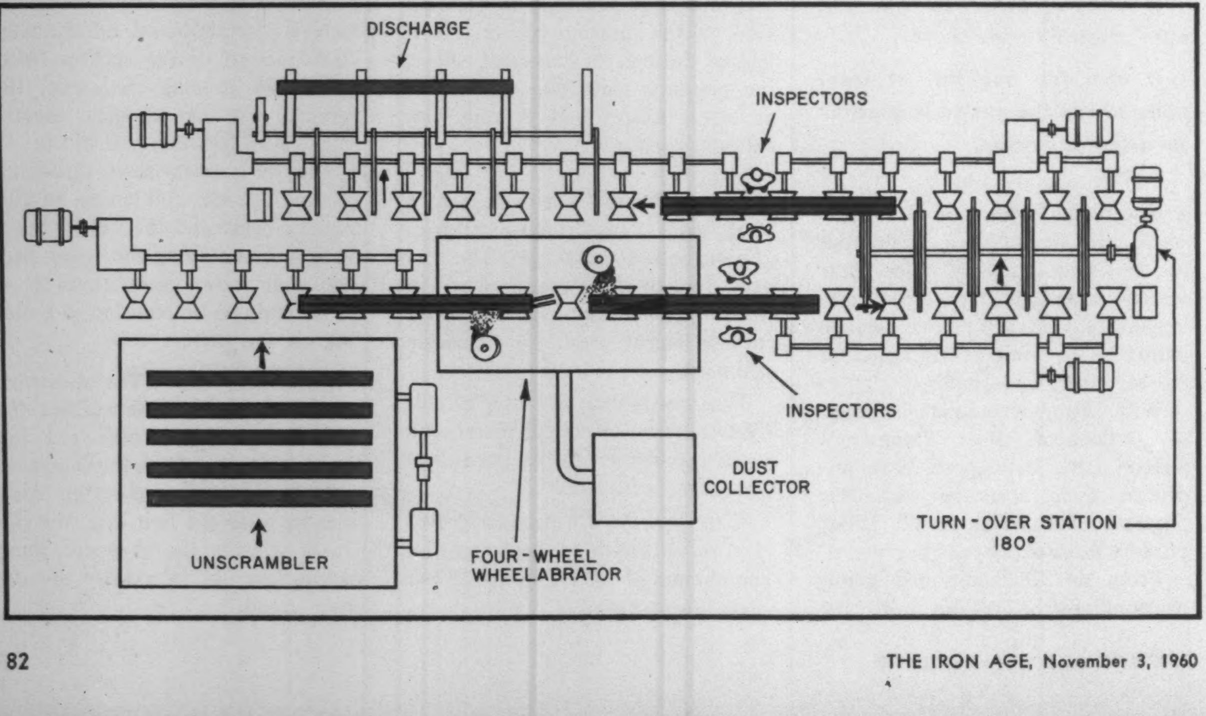
All scale may be removed from the surface of the slab or billet to expose the defects. Or, if desirable, a trace of scale can be left in the defects, making them more pronounced for the inspector.

Properly engineered work handling units send the descaled pieces to the inspector in a continuous manner. This increases output.

Certain types of conveying equipment position the billet for inspection of two sides at the same time. It then automatically rotates the piece 180° to pass a second inspection station for the other two sides.

Flaws Stand Out—The exact ex-

Follow Billets Through the Descaling Process



tent of the defect is immediately apparent. Thus, the inspector need not mark any larger area for removal than is needed. Many apparent defects with the scale intact prove not to be defects when the scale is removed.

Many times the nature of the exposed defects dictate the use of spot scarfing, grinding or chipping for removal. Here only a minimum amount of metal need be removed.

This ability to detect short, shallow defects conserves virgin metal and increases the yield that might otherwise be lost.

Cuts Cost—Because of the scale-free surface produced by mechanical blast descaling, the cost of surface grinding, chipping, and scarfing is reduced. Grinding a scaly surface loads wheels and requires higher grinding pressures.

The buildup on the wheel reduces cutting ability and causes rapid deterioration to the wheel itself. Also, loaded grinding wheels produce higher frictional heat, causing the metal to smear over defects without removing them.

Planned Use—A large steel producer in the Chicago area plans to run a complete descaling setup by early 1961. The diagram shows the modern handling facility which will be used at this installation.

The machine, capable of handling over 200 tons of billets per hour, operates at an average hourly rate of 75 tons. The billets will vary in size from 3 x 3 in. to 7¾ x 7¾ in. This Wheelabrator unit employs four abrasive-throwing wheels which propel a total of 114,000 lb of steel grit per hour. Over 99 pct of the delivered abrasive is re-used.

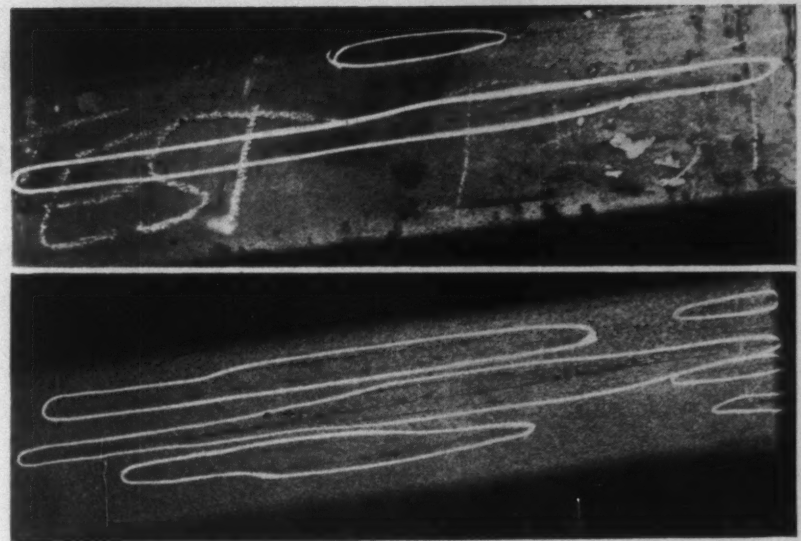
At another steel mill an airless blast descaling machine uses six wheels to clean stainless steel slabs. The slabs range in size up to 52 in. in width x 6½-in. thick x 188-in. long. Output is set at 7000 tons per month.

The wheels in this unit hurl 216,000 lb of abrasive per hour—insuring a cleaned surface with all surface defects revealed.

Proper Design—The type of equipment needed for cleaning slabs and billets differs from plant to plant. Your choice depends on the shape and size of the work and tonnage requirements.

Variations in design include the work conveyance systems and the number, location, and horsepower of the abrasive-throwing wheels. Abrasive size and volume to be thrown by the wheels provide other design factors.

Proper selections of size, shape, and type of abrasive will result in lower overall operating costs. It will also provide the desired surface finish and remove the degree of scale required in the shortest time.



REMOVES SCALE: Inspection marks on the encrusted billet (top) indicate visible defects to be removed. However, under the scale are other defects which could go undetected if the billet isn't descaled.

TABLE SWINGS: This unit handles various sizes and weights of titanium due to its unusual construction. Pieces are placed on the work table which is mounted on the door for easy access into the blast area.

How Foremen's Incentive Plans Help Cut Production Costs

By **J. R. Walley**, Walley & Associates, Park Forest, Ill.

Bonus plans for foremen have been sampled by many companies. To be successful, they must be supervised properly.

Follow these steps and you'll have a rewarding program.

▪ Foremen incentive plans are installed in metalworking plants to get certain results. If these results are not attained, the incentive plan is either revised or removed. Study of many weak and failing plans reveals that the number one reason for failure is poor or non-existent administration.

Executives who install new systems of any kind in their plants know that you can't do this without careful and close follow-up. Most companies feel that the money motive alone should be enough to make the plan work. Experience proves that this is not true.

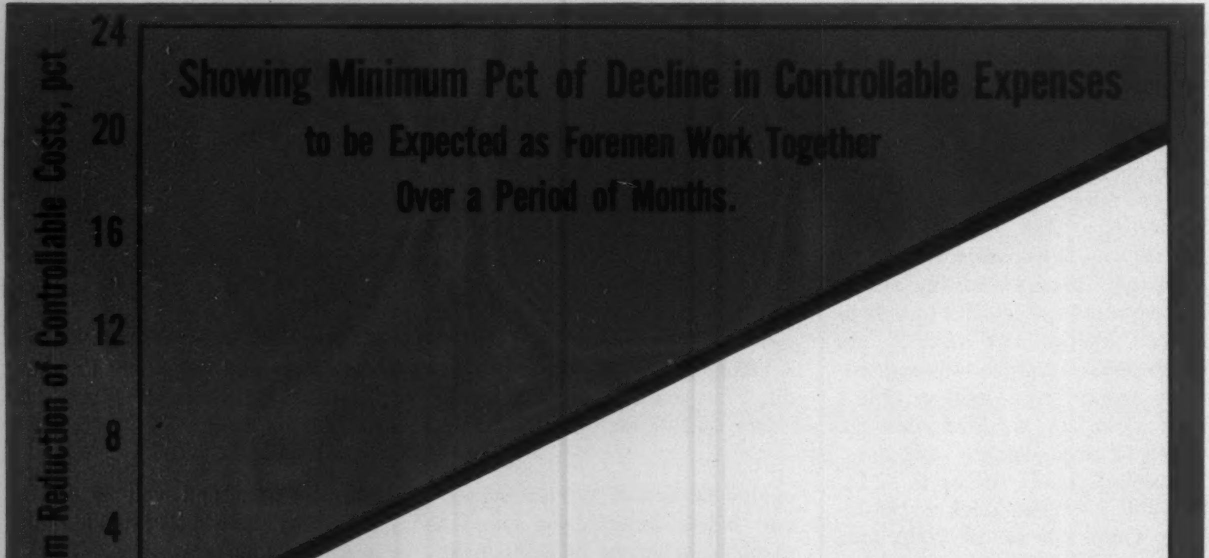
Let's take a brief look at the foreman. The plan is to get him to improve performance on the job. He knows a great deal about tooling, machining and the techniques of making metal parts. His main job, however, is to get results through people.

As such, the foreman must plan, schedule and use the manpower, equipment, materials and supplies that management has given him for production.

Four-Way Benefits — Foremen's incentive plans are installed in metalworking plants for one or all four of the following reasons: to cut costs, to build morale, to broaden viewpoints and/or to increase pay.

Management knows that foremen control the many expense dollars required in manufacturing. That puts them in a position to create savings.

Teamwork Pays Off to Reduce Expenses



Plan Your Meetings Wisely

Make sure every meeting starts and stops according to schedule. Restrict meeting length to one and one-half hours.

Review past assignments. Find out what progress has been made.

Examine budgeted expense items one by one.

Place special emphasis on variances between budgeted and actual expenses.

Bring foremen into the discussion. Let them plot remedial courses of action.

Appoint committees to solve current problems.

Hand out incentive pay checks at the meeting.

Copies of minutes should be circulated within 24 hours.

Recent surveys disclose a trend for foremen to join unions. One reason foremen give for this move is that they are not treated as management.

The men chosen for first level supervision usually don't know too much about overall plant problems. Through supervised plans, based on budget controls, foremen are able to grasp a much broader view of company operations.

Narrow Gap—As the use of incentive pay plans increases, the range between a foreman's earnings and that of his subordinates has narrowed. A well developed incentive plan gives the foreman a chance to increase his pay while meeting company cost goals.

Expediency—the need to complete production goals quickly and to reduce scrap sharply—may bring about the situation where an incentive plan is installed on short notice.

The foremen aren't even ready for it. Hastily devised incentive plans for foremen often add to manufacturing expense.

At the Finger Tips—Assume that a plan in effect has been installed to reduce operating expenses. In this plan, the foremen exercise control over labor, materials, supplies, utilities and scrap. How can you tell whether you are getting results or not?

You should drive expenses down at a certain minimum rate. Check the expense graph as a guide to monthly performance. Your expenses should decline at least at these rates.

When such a plan is not yielding expected results, management can take one of three courses. It can either live with the plan, eliminate it entirely or revise and improve the plan.

Leadership—Suppose you want to get the most from your present plan. That being the case, you should analyze the conduct of the monthly foremen's meeting. If this step is neglected, the best of incentive plans will fail.

Of course, the "bull session" type of meeting is a liability. Try to avoid it. The man who supervises the meeting has four main jobs. First, he must report what the group has done to control expenses in line with the budget. Next, he should analyze any variances from budgeted amounts, especially any expenses in excess of the budget.

The supervisor should also figure out what action is needed to drive excess costs down below the budget. Just because some expenses are already below the budget is no reason why they can't be lowered even further. Finally, he should determine a way to discuss performance on the job in line with the budget. This is a company goal.

Give Them a Chance—Management has to be more realistic. How can the foreman be expected to achieve results unless management fills him in on vital details? The foreman should know the volume of work his group turns out, total payroll expense and scrap expense. Keeping him informed on these points adds that much more fuel to the incentive fire.

The meeting supervisor must make sure that each foreman is kept posted on such details through the monthly expense report. A supervisor won't be worth his salt unless he takes care of some very simple details. A report must go to each person who attends the meeting.

By studying the current report before each meeting, the supervisor will be able to guide the discussion more effectively. Also, by looking over an advance report, the supervisor can fashion a timetable for the meeting.

Sound Approach — Divide the meeting into three equal parts. Spend the first 30 minutes in reviewing past projects. In the next half hour, go over the variances that have cropped up. The final 30 minutes should be spent in planning

Where Savings Are Found

Monthly Expense Report

DESCRIPTION OF EXPENSE	ACTUAL EXPENSE, $	ALLOWED EXPENSE, $	DOLLARS SAVED	SAVING, pct
Labor Expenses				
Milling	2,382	2,955	573	19.4
Grinding	780	940	160	17.0
Drilling	5,142	5,423	281	5.2
Turning	756	996	240	24.1
Boring	1,842	2,304	462	20.1
Forge	3,851	4,869	1,018	20.9
Bench	3,020	3,870	850	22.0
Maintenance	1,651	1,850	199	10.8
Receiving	419	642	223	34.7
Scrap handling	931	1,042	111	10.7
Shipping	2,240	2,105	(135)	(6.4)
Stockman	2,190	1,920	(270)	(14.1)
Fireman and Janitors	1,662	1,561	(101)	(6.5)
Other Expenses				
Supervision	3,564	3,513	(51)	(1.5)
Cutting oils	354	341	(13)	(.4)
Fuel oil	2,740	2,691	(49)	(1.8)
Maintenance supplies	4,670	4,371	(299)	(6.8)
Electricity	1,602	1,571	(31)	(2.0)
Scrap	5,586	5,623	37	.7
Overtime	1,805	1,190	(615)	(51.6)
TOTAL	$47,187	$49,777	$2,590	5.4
				+5.0
			Bonus, pct	9.4

( ) Denotes loss

ways to reduce expenses in the coming month.

There's a system in analyzing variances in expense items during the meeting itself. After each foreman has his copy, read each item aloud. Stress those items where variance occurs. Then try to find out from the group why differences occur.

The supervisor should keep a record of the reasons given for an expense item being higher than the budget standard. When no satisfactory reasons are given, that's the time to appoint a committee to study the matter further.

Key Word—The key word during the discussion period is "why." Why can't the inspector pass certain work as finished? Why can't maintenance send a man to repair the mill as soon as the report is made? Why is it that one foreman consistently runs his group in the black? Answers to such questions add to the success of the monthly meeting.

During the meeting, you'll note the building of team spirit, particularly during the study of variances. The foremen will get a chance to explain their positions, viewpoints and problems in relation to expense items.

Here, new foremen gain from contact with older, more experienced leaders. Likewise, this is where each man learns from the other as to why certain conditions exist.

New Skills—Success with an incentive plan goes beyond cutting expenses. A greater reward is the training and practice in managerial principles. The foremen are informed about cost and volume in their monthly reports. Then, in the meeting itself, they become skilled in studying variances.

To plan future action, each cost item that is "in the red" should be discussed separately. At the same time, a record must be kept of the suggestions for reducing the expenses.

It's best to appoint one person to explore the ideas presented by the group. If needed, give this person a committee to work with.

Set a date on which findings or results of action will be reported. Also, give each foreman a copy of the projects assigned during the meeting.

As management knows too well, the fight against rising costs is a never-ending task. The fact that a company has a foremen's incentive plan doesn't alter this situation one iota. It does make the fight somewhat easier, however. Why? Because the foremen are better informed. They also develop a deeper insight into company aims.

From Ideas to Action—A big step in making a foremen's incentive plan work is to get action when needed. That doesn't just mean that foremen should be told what to do. The supervisor makes the decision, but only after he has considered the best opinions expressed by the group.

What benefits will a company reap from such a planned program? First of all, your foremen will begin to feel that they are a part of the management team. As a result, a greater spirit of cooperation will develop between foremen and supervisors. Foremen will gain a better perspective of company operations.

Morale will soar, too. Foremen will be working together to accomplish a vital goal: expense reduction. As costs decline, the foremen will have a continuing interest in taking action as needed. The result will be the best operating expense consistent with volume.

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Ask for Reprint **No. 118.**

Computer Keeps Parts in Check

Along Trans World Airline's 50,000 mile route, a jet-age program is hard at work.

This maintenance program makes possible the maximum use of more than 30,000 parts.

■ Safety and good service are the results of an aircraft maintenance program. It combines the latest in communications and electronic data-processing methods. Belonging to Trans World Airlines, the system has its roots at Mid-Continent Airport, Kansas City. The maintenance program involves keeping tabs on more than 10,000 powerplant parts and 20,000 airplane parts. These parts are known as time-controlled units.

Time-controlled powerplant parts are short-hour units. Their service life falls far short of the airframe overhaul times of 4000 hours for piston aircraft. Airframe overhaul time for jets is 3000 hours. These parts are subject to strict control by the Federal Aviation Agency. All units must be replaced before accumulating a specified number of flight hours.

Large Assignment — Scheduled and unscheduled part changes complicate this monumental accounting task. However, it has been done on a daily basis. A desk-size electronic digital computer, marketed by the Royal McBee Corp. of Port Chester, N. Y., accomplishes this feat.

The computer is used in conjunction with a world-wide teletype system. TWA receives and analyzes information at a speed made necessary by the jet age.

A jetliner can cross the United States in five hours, return the same day and require part changes on both coasts.

Daily Reports — Each morning, the digital computer is fed information on every craft in the 184-plane fleet. The teletype-computer combination produces current comprehensive reports.

Stored in the computer's memory are: the plane number, engine numbers and locations; time-controlled unit serial numbers; and the time since last overhaul for all items. Also stored in the computer is basic program data on FAA allowed time limits.

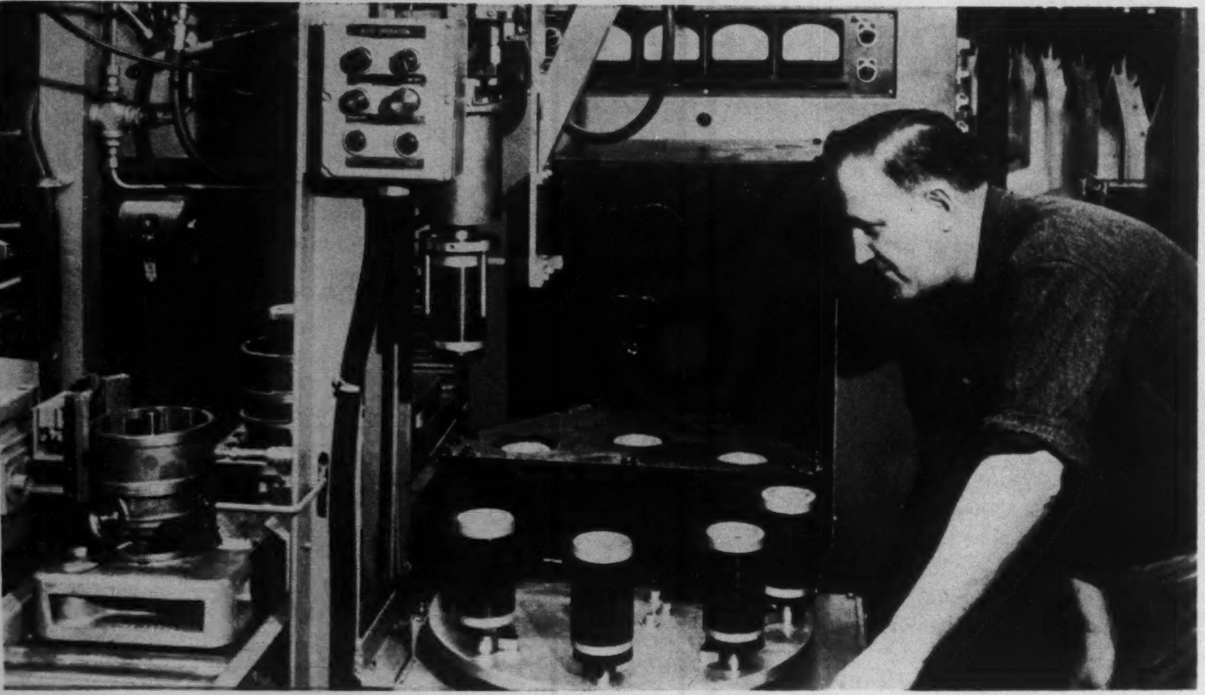
Input is simply the plane number and flight hours. The computer finds the right plane listing and updates all items. It checks certain specified parts against the FAA maximum time limits. The computer then prints out the time the part change must be made and the hours remaining.

Programmed Fleet—At TWA, all computer programs are run according to its fleets. Time-controlled parts that have exhausted their allowed time are returned to the maintenance base for complete overhaul. Unit time reverts to zero.

Time on the airframe itself and associated airframe parts are also controlled by the computer. An accumulated-hours report is available daily. Airframe components are long-hour units whose useful life generally exceeds the airframe overhaul period of 3000-4000 hours.

Once parts have been removed, part history cards have to be brought up to date. By printing out complete information on part removals, the computer cuts the posting time for the cards in half.

HEART OF PROGRAM: Teletype system and computer provide up-to-date information on flight hours and part changes—plus data analysis.



RAPID ASSEMBLY: At the first station, hot rotors are fitted on the shafts. The turntable revolves through three stages of induction heating. Then the hot, expanded rotors are pressed down on the shafts.

Shrink Fittings Speed Assembly Of Compact Compressors

A multi-stage heat-treating unit shrink fits compressor parts for air conditioners.

It thermally seals each compressor without using any gaskets, fasteners or adhesives.

▪ Shrink-fit heat-treating equipment piles up savings for the Carrier Corp. of Syracuse, N. Y. This equipment plays a key role in the manufacture of compact compressors for industrial-and-home air conditioners.

Shrink fittings pay off in several ways. They allow a major reduction in parts. This boosts compressor output—and reduces power consumption.

Each compressor now contains less than half as many parts as its predecessors. As a result, overall production costs have tumbled.

Sales Bonus—The use of shrink fittings offers another bonus. Carrier's new compressors are very light in weight. They feature a high-efficiency rate per unit of mass. This triggers a sales benefit. It's a lot easier to sell compact, efficient air conditioners than it is to "push" big, bulky models.

Working closely with Carrier's engineers, the Induction Heating Corp., Brooklyn, designed and built the semi-automated shrink-fit equipment. This equipment performs three major functions. It fixes rotors on crankshafts. It joins the stators in the crankcase housings. Also, it fits all manifold covers or shells on the crankcase housings.

Before buying the new equipment, Carrier laid down two conditions. The three-step procedure had to fit into a high-production assembly line at the Syracuse plant. And no operation could take more than one minute.

Quick Rundown—Briefly, here's how the new installation operates. The operator presses a cycle-start pushbutton. This starts the heating station's turntable. This turntable indexes one rotor at a time.

As a rotor enters the first position, it encounters a three-place, high-frequency heating coil. This coil induces heat into the rotor—and only into the rotor—by the induction principle.

Continued indexing carries the rotor through two more heating stages. Then a hydraulically-operated electromagnet picks up the hot rotor and transfers it to the first assembly area.

The transfer's carriage is also hydraulically operated. It moves the entire electromagnet and lift-cylinder device from the heating area to the assembly area.

Fixed Alignment — As transfer takes place, the operator positions a compressor housing in the assembly area's alignment fixture. This housing contains the crankshaft. A foot pedal and lever are used. The pedal causes a pin to come under the housing. This pin lifts the housing up and positions it for rotor-shaft seating.

The electromagnet lowers the rotor onto the shaft. Having expanded in the heating stages, the rotor slides down the shaft quite easily. With its work done, the electromagnet de-energizes and returns to the heating station to await another rotor.

Rotors cool and "freeze" on the shafts with almost no time delay. Then the completed assembly is pushed along to the next operation.

All of the rotor-shaft-joining equipment takes up about 36 sq ft on the plant floor. This equipment produces more than 60 assemblies per hour.

Second Station—Now, let's consider second-stage assembly. Each crankcase is heated prior to shrink fitting a motor stator to the housing. Here, too, the work station and the automatic fixture form an integral part of the conveyorized assembly lines at Carrier's Syracuse plant.

All crankcases travel on aluminum pallets along the conveyor. These pallets locate the crankcases in the proper position for stator insertion.

When a pallet reaches a point directly under the work coil, the fixture portion of the conveyor stops. It remains in position until the cycle is initiated.

Meanwhile, the crankcase — which has just been heated—passes to the stator-assembly area.

Fast Warm-Up — The operator starts the cycle by pressing a single button. Automation now takes over. The pallet moves up into the work coil as the heating cycle begins. Resting on the pallet, the crankcase is heated to about 400°F in 25-30 seconds.

At the end of the timed cycle, the pallet moves down and passes on to the second assembly station.

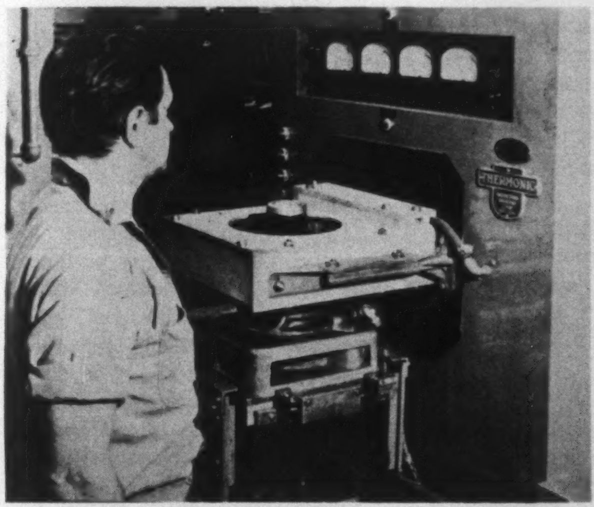
A single generator serves both work stations. It's a 20-kw generator of the vertical type. Output voltage is 220-440 v at 3000 cycles. The power switches from one station to another via a memory circuit. Thus, this generator shrink fits rotors to crankshafts at one station and it shrink fits the stators in the crankcase housings at the other station.

Dual Coils—The third work station incorporates two work coils. These coils are mounted on the same fixture. The top coil heats all casings which have outside rings. Its mate heats the male half of each housing.

To activate this station, the operator manually places a male casing within the proper coil. A holding device fixes the casing in the up position.

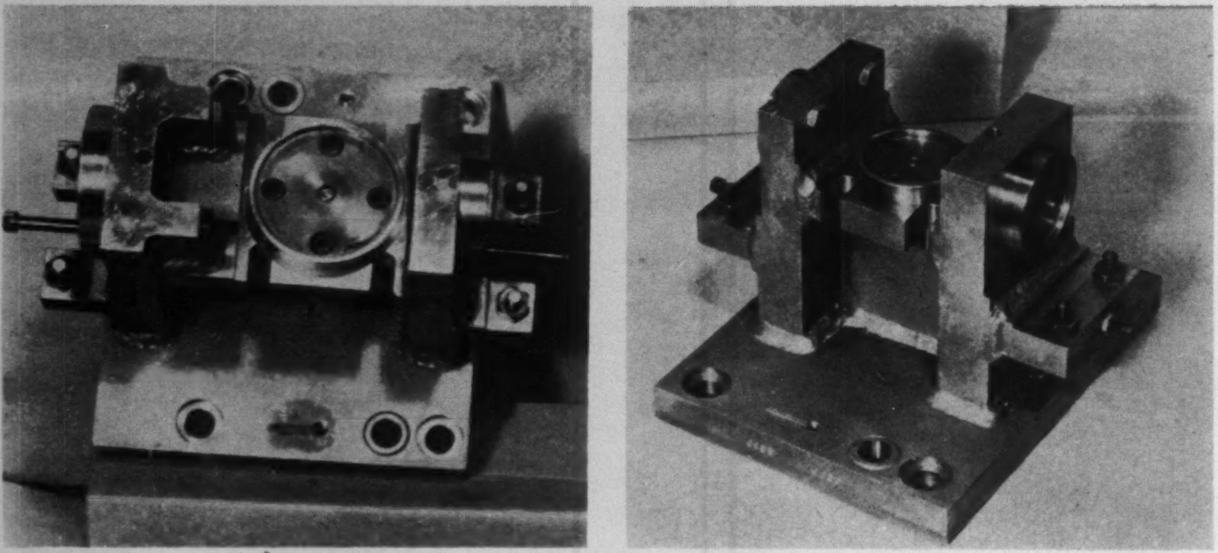
A preset timer starts the coil. The coil, in turn, heats the casing to its expanded temperature. Then the lower table automatically raises the casing into its cover. This action presses the cover securely in place.

The top coil performs the same type of work. However, it heats female casings. While it's operating, this coil dips down into the same coil area previously occupied by its mate. A single set of contact-disconnect leads serves both coils.



STATOR JOINS CRANKCASE: It takes 25-30 seconds to heat the crankcase prior to assembly.

FINAL STEP: With perfect seals, shrink fittings secure manifold covers to the crankcase housings.



EASE PRODUCTION: Fixtures are versatile tools. Those, shown above, allow three faces of a workpiece to be worked on simultaneously. Others, homemade of standard parts, perform a variety of routine tasks.

How Simple Jigs and Fixtures Save Production Time

By **Federico Strasser**—Consultant, Santiago, Chile

Jigs and fixtures are vital to many metalworking operations.

They needn't all be deluxe, custom-built items, though. Many can be made from standard shop parts.

▪ A tool must comply with certain technical needs. It must also be economical. It's vital that the cost and time spent in building a tool relate to the quantity of workpieces produced with it.

Let's consider the case of drilling jigs. For high production jobs, drilling jigs must include a number of features to insure high efficiency. They must be quick to operate, yet give accurate service. It doesn't matter that initial cost and maintenance expenses be high; distributed over a large number of workpieces, the unit cost will be small.

Cost Is Vital—In case of batch production jobs, however, the cost of a jig becomes important. A number of other factors must be considered so that less time, material, and expenses are spent in building the drilling jig.

A jig has a number of functions. These include greater workpiece changeability, less layout and assembly time, better machine tool utilization, and improved prospects for repeat orders.

The chief function of a drilling jig, perhaps is to reduce production costs. It is not justified, though, if savings are eaten up in building the jig.

Simplifies Design—Several factors must be taken into account when designing and building low-cost drilling jigs. These factors may be considered singly or together. Included are: design simplification; elimination of some basic component; use of inexpensive building materials; use of standard parts, equipment, tools; composite construction with reusable components.

Take design simplification, for instance. The jig needn't be fancy. The tool designer shouldn't always be overly concerned about speed and ease of operation, long duration, replacement of worn parts, and automatic ejection. And a surface which bears no direct relation to function and accuracy needn't always be given a special finish.

Which Components?—According to sound tool design practices, every jig should have certain basic components. Cutting tool guide, holder for guide and workpiece, rest surfaces, stops, clamps, and knockouts are some of them.

It's possible, however, to eliminate a few of these basic components. Sometimes, several functions may be united in one given part. Other times, some functions may be affected by the part itself.

Low-cost materials may be used for building temporary jigs. Both quality and close dimensional control may be overlooked somewhat when long tool life is not a prime factor. Excellent results can be obtained with structural steels. On occasion, jigs can be made of scrap materials.

Try Homemade Jigs—Standard or homemade jigs are excellent choices for those cases where cost reduction is the chief goal. There are several manufacturers who turn out—in large lots—many types and sizes of low-cost, basic, jig components. It may pay to take a closer look at them.

Whenever possible, composite building of jigs is preferred. A number of advantages may be realized. For example, when the jig is disassembled after a production run, the components may be used for other jobs.

These jig components may also be commercial or homemade products. They are usually made according to house standards based on past experience.

Natural Location—Consider the fixtures shown on the opposite page. They position pneumatic and hydraulic cylinders. Each cylinder model requires two different end housings.

Four holes must be drilled through the face of each housing. One of the fixtures, mounted on a sliding table, governs all operations.

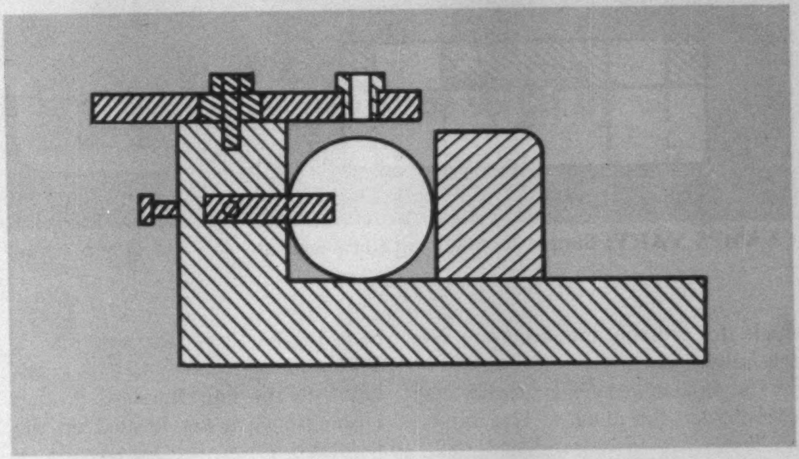
One housing rests on the fixture's crossbar. Two more stand vertically against the fixture's legs.

A Simple Plate—The simplest drilling jig is called a drill template or template jig. It's the top left drawing on the last page. It consists of a steel plate in which holes of proper diameters are drilled at prescribed locations.

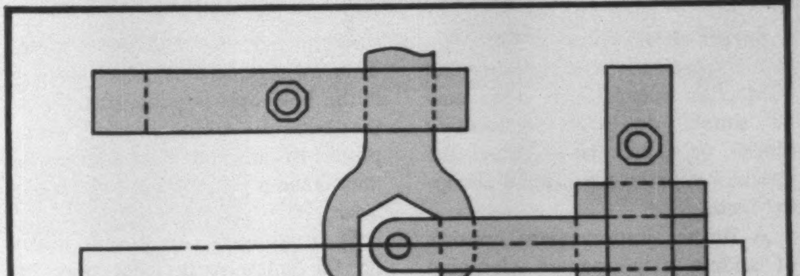
To use it, all that's required is to fasten the plate to the workpiece with a clamp. Then drill the holes in the workpiece using the guide holes in the plate.

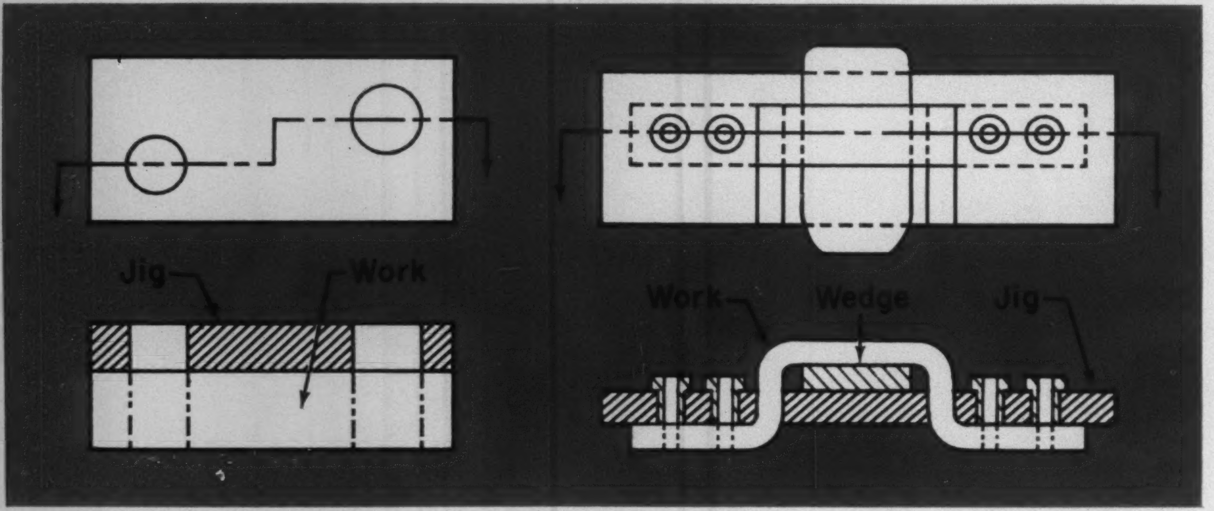
If large numbers of workpieces are to be drilled with the open plate jig, then a few changes may be

Vise Also Serves as Fixture



Standard Parts Make Up a Jig





CLAMPS VARY: Simple template jig (left) uses any kind of clamp. Other jig takes a wedge for clamping.

made to prolong the accuracy of the holes.

The first approach is usually to case-harden the plate. If very large quantities are to be produced, drill guide bushings can be used. A point to remember is that these bushings are reusable. Thus, you may decide to use them even if the job does not economically justify them.

Speeds Production — Adding a few stops will increase accuracy and production speed. Such stops may be simple dowel pins, locating blocks, or screws. In this case, the operator supplies the needed clamping force.

A further improvement consists of adding a permanent clamping device to the jig. This move avoids loss of time and the need for separate fastening means.

In low-cost jigs, the permanent clamping device is usually a screw or bolt. Although slower in operation than deluxe devices, screws are inexpensive and reusable.

Uses Wedge to Clamp—Wedges are often used in jigs and fixtures for clamping the workpieces. The second drawing points up the use of a wedge in a very inexpensive and simple jig.

The jig consists mainly of a plate and a wedge. The plate is made of cold-rolled steel. In the middle, it has an opening which is a sliding fit to the handle of the workpieces. This opening locates the part in relation to the four standard drilling bushings which are located on the jig-plate. From the other side, a wedge is driven between workpiece and jig-plate.

Need Some Feet—Jigs, discussed up to this point, have no feet or rest surfaces. The workpiece lies directly on the drill-press table. This arrangement is possible only if the hole axis is perpendicular to the bottom surface of the workpiece. In any other case, the jig must have a suitable base or proper legs.

If in a hurry, an easy-to-make jig for small workpieces may be made from an ordinary bolt wrench, two straps, a bushing plate, and a spacer. The drawing shows how.

Setting of the tool is as follows. Lay out a master workpiece and drill it. Locate loosely the master workpiece, wrench, bushing plate, and spacer. Introduce the drill through bushing and workpiece. Lean the wrench against the master workpiece. Clamp both straps.

The jig is now set up for use. The operator can hold the workpiece by hand against the wrench opening faces.

Uses V-Block Also—This kind of jig works for rectangularly shaped components or those which can be guided by two parallel surfaces. For round workpieces, an analogous device is made by replacing the wrench by an ordinary V-block. The clamp which fastens the V-block also serves as the backstop for the workpiece.

This same principle of design may be extended by using an ordinary toolmaker's parallel clamp instead of the wrench. The range of the clamp is adjustable between rather wide limits. Thus, the same tool may be used for different size workpieces.

For some reasons, tool designers make little use of vises for jigs and fixtures. They're especially handy for short run and emergency cases. With an adjustable bushing plate and stop, a simple machinist's vise is easily transformed into a universal drilling jig.

Such devices can be used for flat and extruded shapes in addition to rounds. And using special jaws extends the utility of such vises with little expense.

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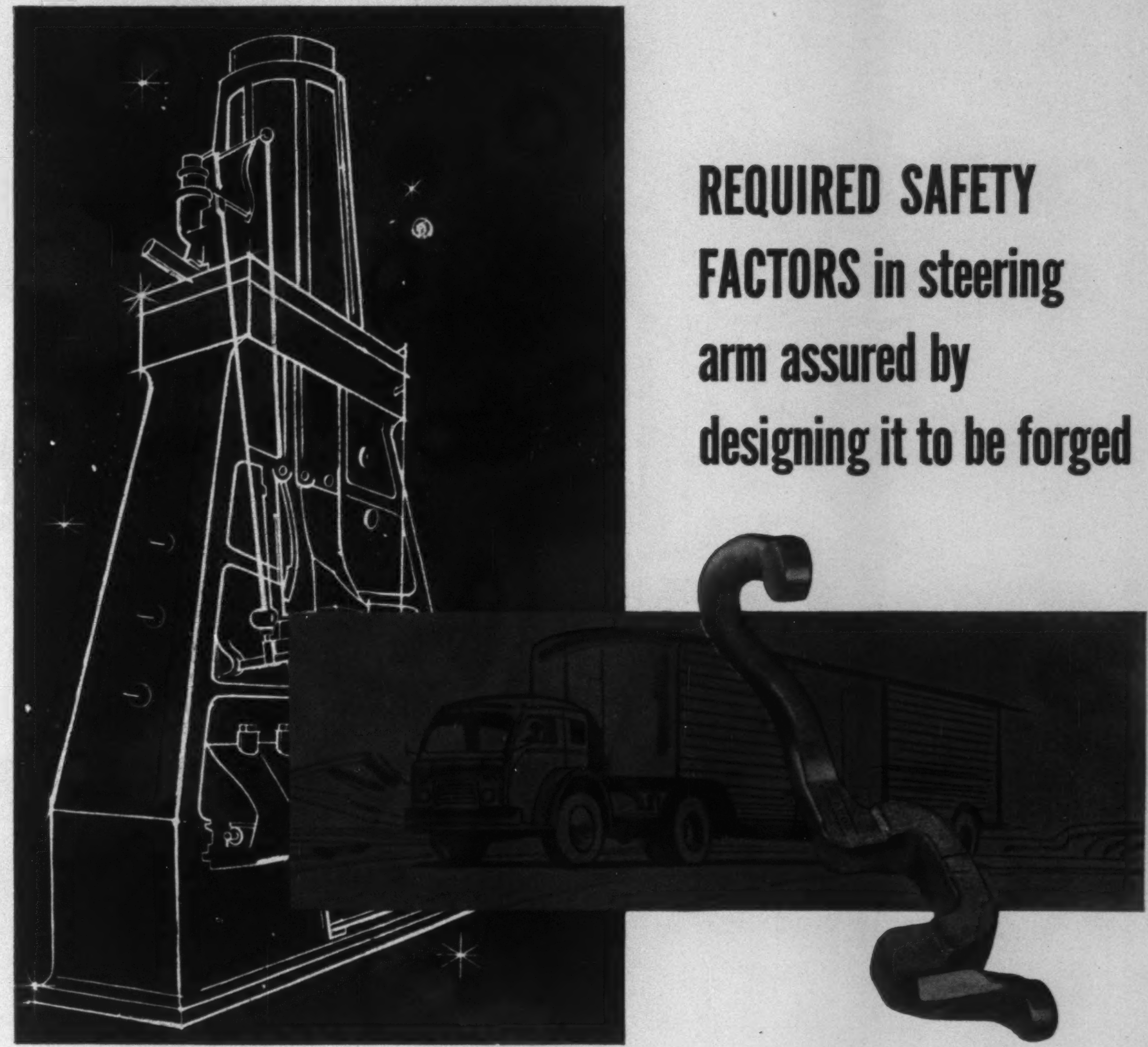

Typical steam forging hammer

By designing with forgings, a truck manufacturer can count on the required safety factors, with minimum "beefing-up" of parts to offset unknown internal structures or non-homogenious materials.

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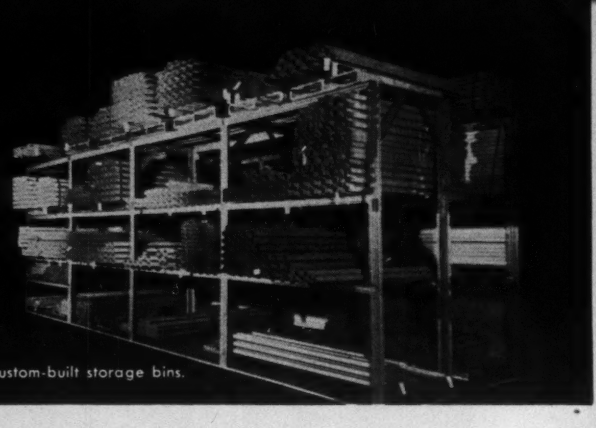
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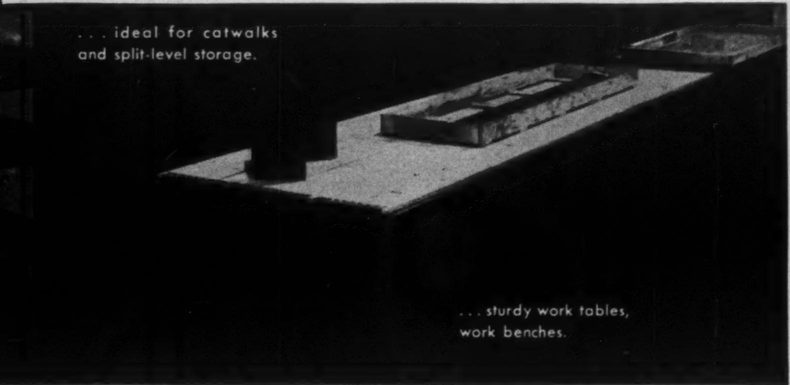
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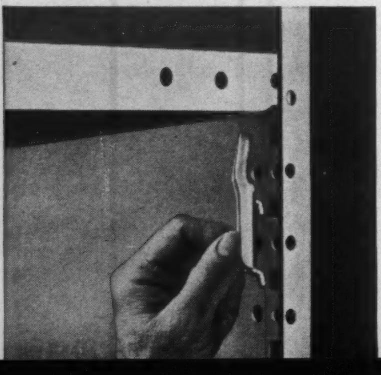

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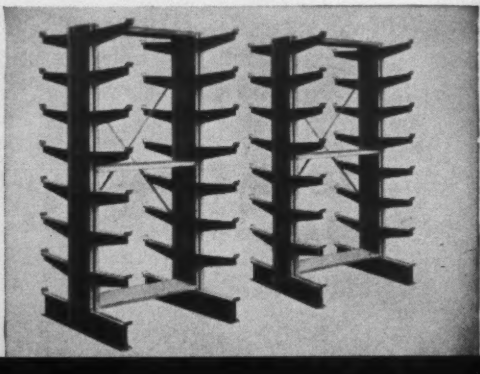

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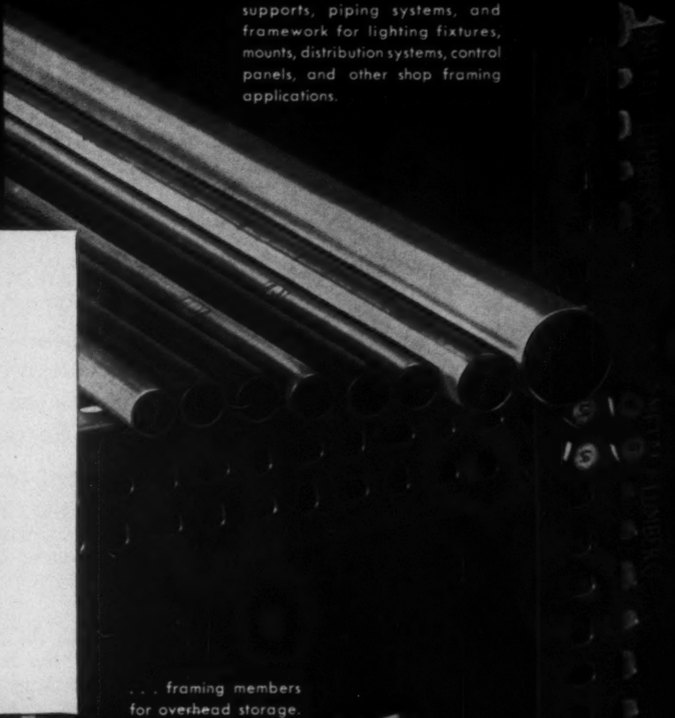

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THE WORLD'S MOST MODERN GRAVITY DROP HAMMER--

The IMPROVED CECO-DROP

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Pre-selected pattern of long and short strokes for Semi-automatic Forging

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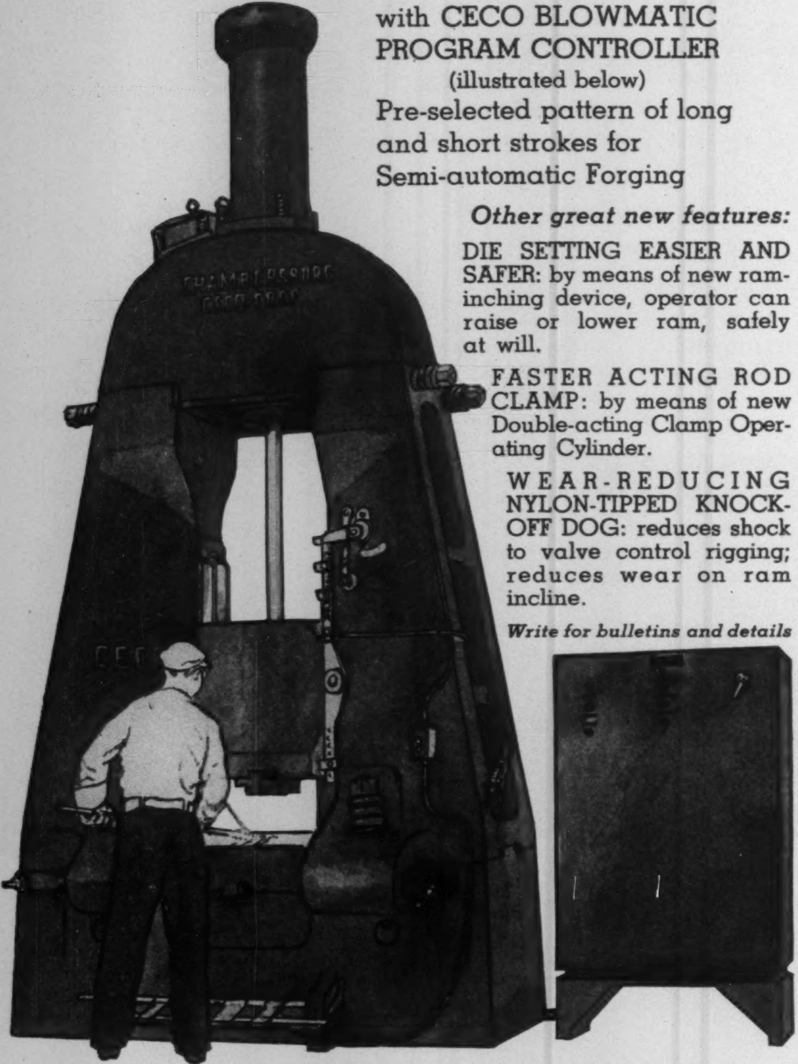

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

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• The Hammer Builders •
DESIGNERS AND MANUFACTURERS OF THE IMPACTER

When it's a vital part, design it to be FORGED

PATENT REVIEW

New Patents In Metalworking

No Surface Defects

Hot extrusion of metals, J. Sejournet (assigned to Compagnie du Filage des Metaux et des Joints Curty, address not listed), Oct. 11, 1960. Improved process for eliminating surface defects, such as faults, when extruding metals or alloys, e.g., high speed steels. No. 2,955,709.

Deters Spelter

Continuous hot dip galvanizing of metal strip, W. L. Diehl and H. S. Bell (assigned to Wheeling Steel Corp., Wheeling, W. Va.), Sept. 13, 1960. In the hot dip galvanizing of metal strip, a method is provided for inhibiting the carrying up out of the bath of an excessive amount of molten spelter. No. 2,952.568.

Atomizes Molten Metal

Apparatus for atomizing molten metal, W. L. Batten and G. A. Roberts (assigned to Vanadium-Alloys Steel Co., Latrobe, Pa.), Oct. 18, 1960. In an improved apparatus for atomizing molten metal, e. g. iron and iron alloys, the spray nozzles are arranged to deflect the molten metal stream continuously. A plurality of intersecting liquid sprays is used. No. 2,956,304.

Sheet Steel Enameling

Enameled sheet steel, D. J. Blickwede, J. W. Frame and E. H. Mayer (assigned to Bethlehem Steel Co., a corp. of Pa.), Oct. 18, 1960. An extremely low carbon sheet steel is suitable for enameling. It consists of not over 0.01 pct each of C and P, 0.2-0.5 pct Mn, not over 0.03 pct S, and the remainder substantially all Fe. No. 2,956,906.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

ALEMITE BARREL-TO-BEARING LUBRICATION...

important tool of production!

In today's costly, complex industrial operation, lubrication is more than a simple matter of maintenance! Actually, modern lubrication is an *important production tool* that cuts downtime and boosts production...reduces costs and prolongs machine life!

That's why more and more cost-conscious plant men are taking a long look at lubrication methods. The result—many are switching to years-ahead Alemite Barrel-to-Bearing Lubrication.

A complete Alemite Barrel-to-Bearing Method can be custom-planned for your plant. It can include electric, air or hand-operated equipment . . . everything required for high-pressure lubrication, filling hydraulic systems, servicing oil reservoirs, lubricating gear housings, and refilling grease guns.

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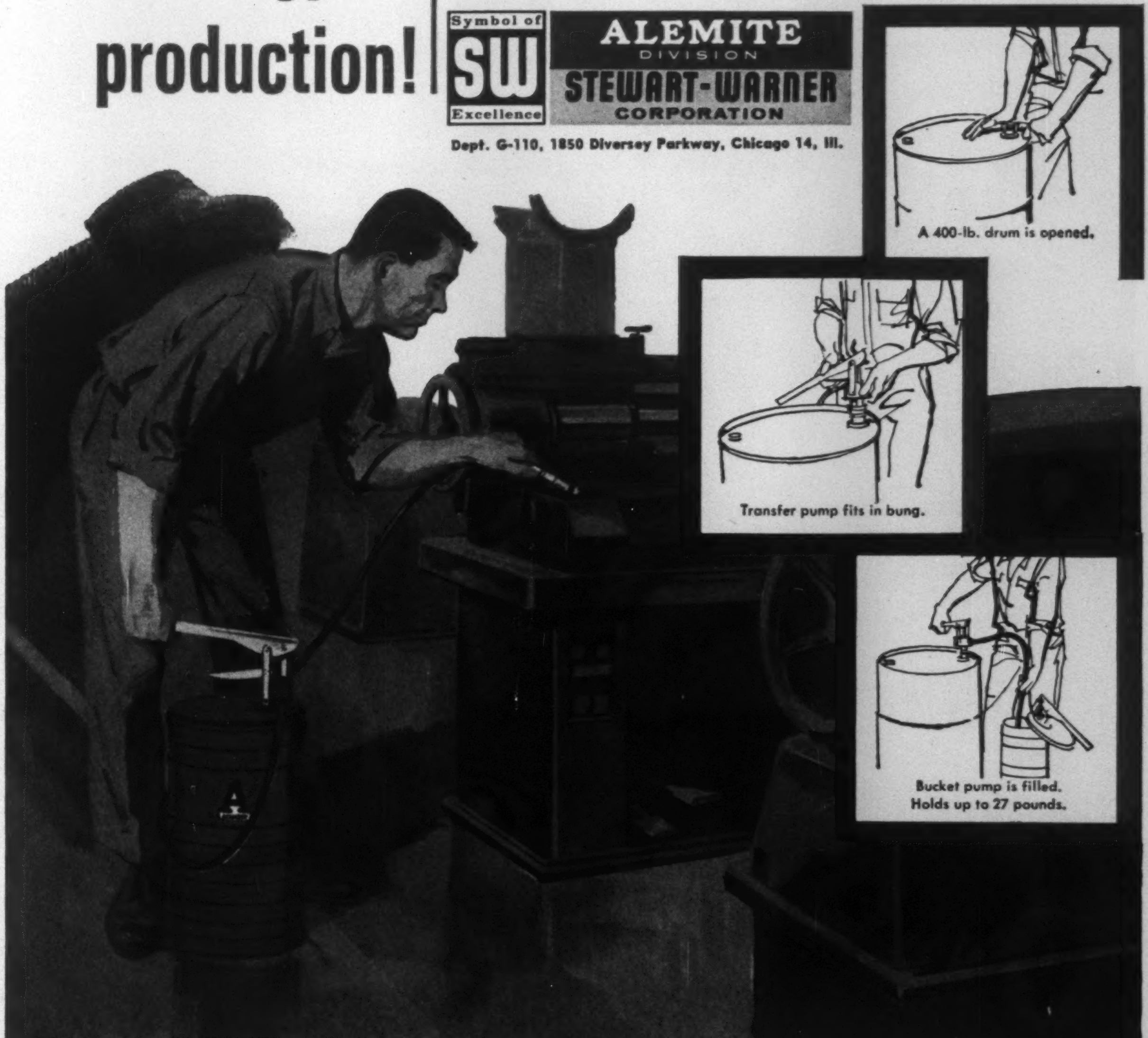
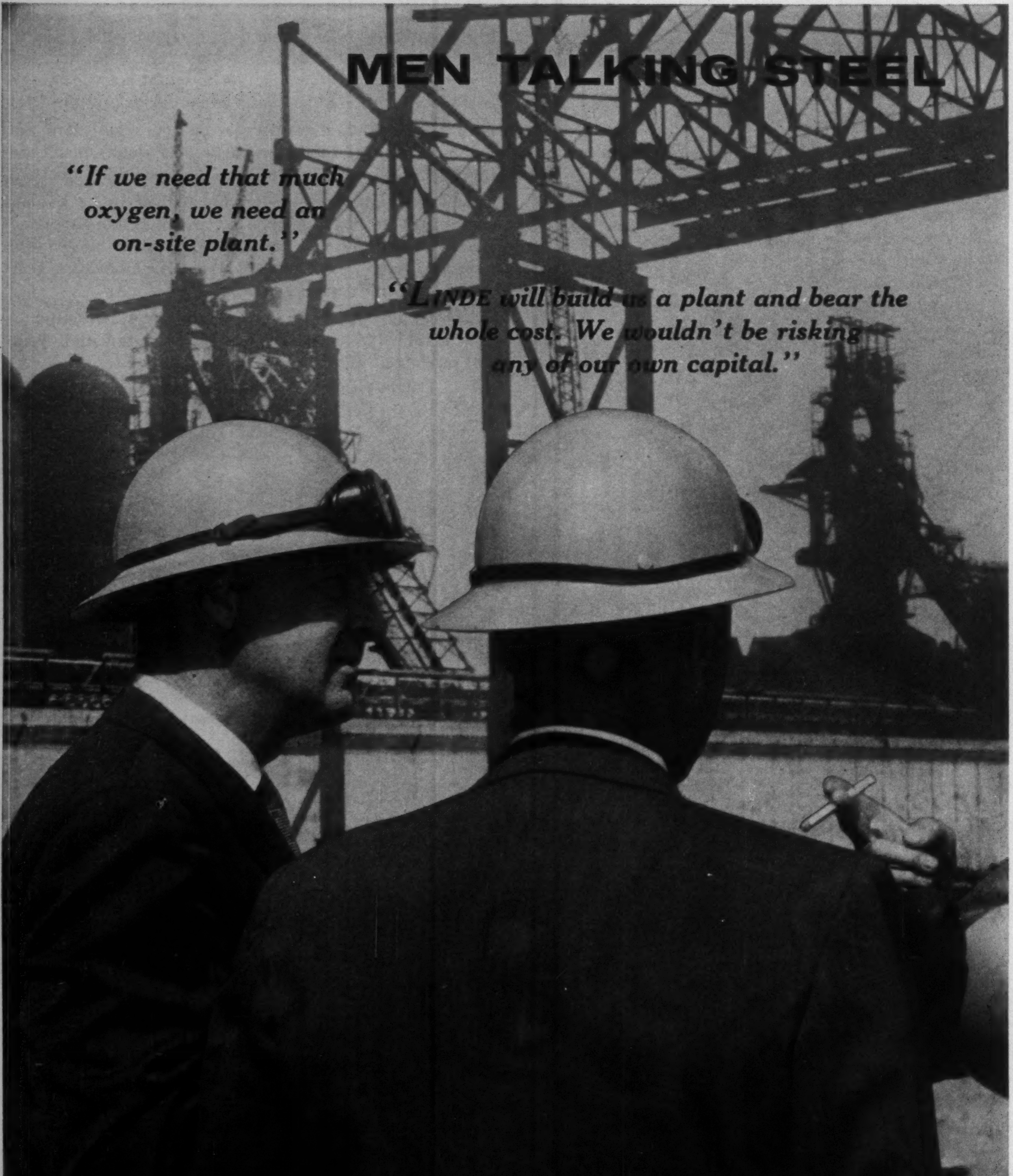


A 400-lb. drum is opened.

Transfer pump fits in bung.

Bucket pump is filled. Holds up to 27 pounds.

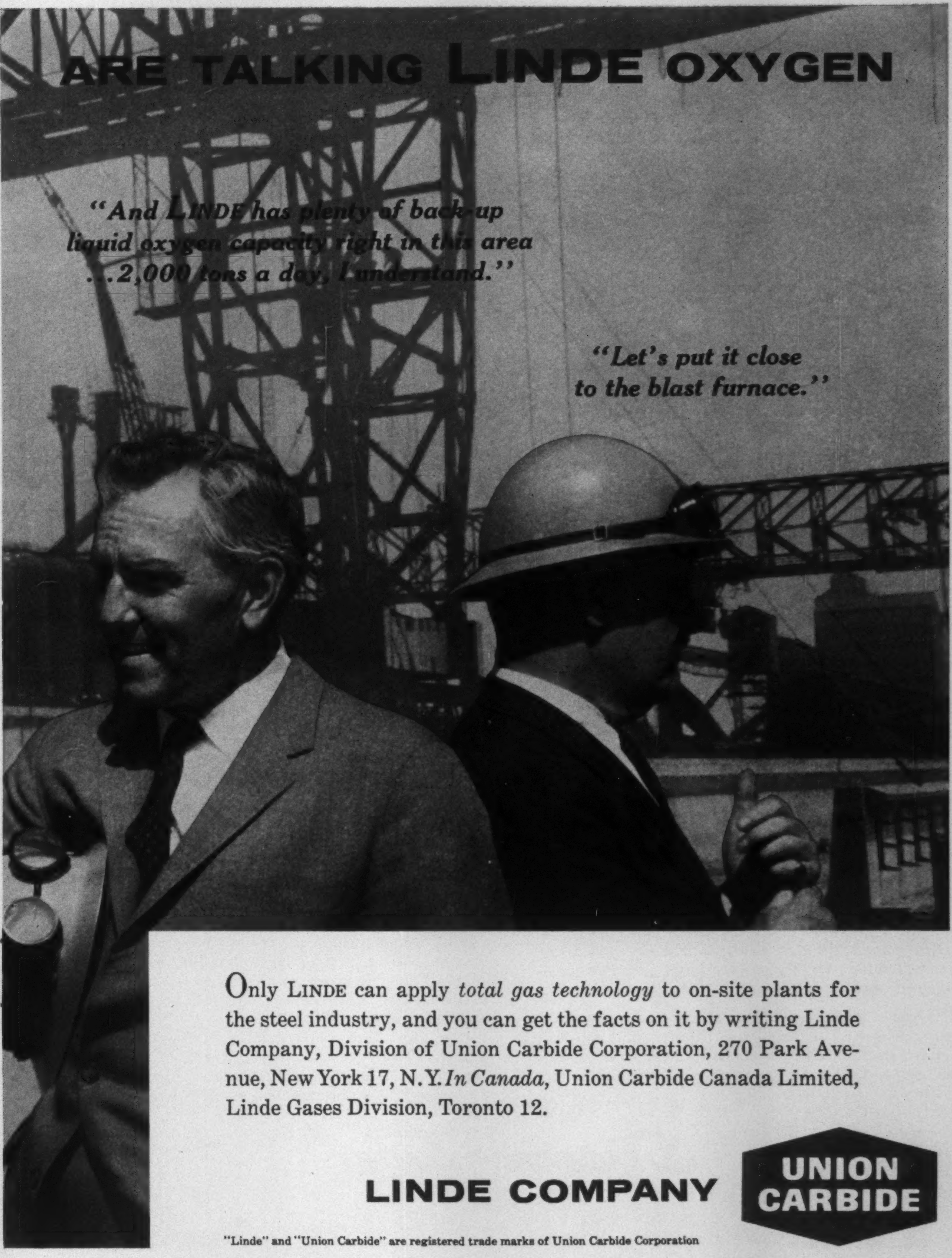


MEN TALKING STEEL

"If we need that much oxygen, we need an on-site plant."

"LINDE will build us a plant and bear the whole cost. We wouldn't be risking any of our own capital."

ARE TALKING LINDE OXYGEN


"And LINDE has plenty of back-up liquid oxygen capacity right in this area ...2,000 tons a day, I understand."
"Let's put it close to the blast furnace."

Only LINDE can apply *total gas technology* to on-site plants for the steel industry, and you can get the facts on it by writing Linde Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N.Y. *In Canada,* Union Carbide Canada Limited, Linde Gases Division, Toronto 12.

LINDE COMPANY **UNION CARBIDE**

"Linde" and "Union Carbide" are registered trade marks of Union Carbide Corporation

Wind Velocities to Mach 7 Prove Needle-Size Superior Stainless Tubing

Manometer lines of Superior Type 304 stainless tubing, drawn to needle size, withstand the vibration caused by air speeds beyond Mach 7 and internal pressures as high as 5000 psi in FluiDyne wind-tunnel tests of missile component models. And they have been in some assemblies for 3½ years without cracking, pinholing or buckling.

FluiDyne Engineering Corp., one of the major designers of such test facilities, attributes the long life of this Superior tubing to both its high modulus of elasticity and its resistance to the corrosive effects of mercury and soldering-flux acid.

Ductility is a big advantage, too. This permits the Superior tubing to be easily hand-bent into complex shapes for application in wind tunnels and readout equipment.

Filling stainless steel tubing orders that call for tiny needle tubing in gages from 6 to 33 or tubing with OD's as large as 1.125 in. calls for the resources Superior has to offer. Why not investigate us as a source of small-diameter stainless tubing. Catalog 21 describes the types and analyses available. Also gives tips on its selection and application. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅝ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Ferrous Forgings

Well-illustrated, a 28-page booklet describes facilities and products of the manufacturer. The company produces drop, upset and press forgings. (American Brake Shoe Co.)

For free copy circle No. 1 on postcard

Die Steel

Characteristics and typical applications of a hot work die steel are given in a data sheet. The data sheet gives instructions for forging, annealing, hardening, quenching and tempering. It also includes hardness data. (Heppenstall Co.)

For free copy circle No. 2 on postcard

Jig and Fixture Parts

A catalog includes full-scale tracing templates of jig and fixture components and over 300 clamping items. It also includes names, addresses and telephone numbers of 64 stocking distributors. (Northwestern Tools, Inc.)

For free copy circle No. 3 on postcard

Mold Handling Systems

For efficient handling of large, medium and small size molds, mold handling systems are described, diagrammed and illustrated in a 12-page bulletin. (C. O. Bartlett & Snow Co.)

For free copy circle No. 4 on postcard

Spindle Couplings

Engineering application, capacity and dimensional data, on dihedral spindle and gear-type flexible couplings, are given in a 12-page catalog. Illustrated are a wide variety of dihedral couplings for use on mills and allied equipment throughout ferrous and nonferrous metal industries. (Ajax Flexible Coupling Co., Inc.)

For free copy circle No. 5 on postcard

Cleaning Steel

The proper preparation of steel before hot dip galvanizing, is pointed out in a bulletin. The literature offers a choice of methods for soil removal and pickling. It also shows how solvent pre-cleaning improves efficiency and gives greater economy. (Oakite Products, Inc.)

For free copy circle No. 6 on postcard

Rod Ends and Bearings

Lined with "Teflon," rod ends and spherical bearings are the subjects of a six-page folder. Dimensional data are also given. (The Heim Co.)

For free copy circle No. 7 on postcard

Electric Truck

A four-page folder illustrates and describes a 2000-lb capacity electric truck. The literature is profusely illustrated with engineering drawings, charts and photographs. (The Elwell-Parker Electric Co.)

For free copy circle No. 8 on postcard

Cradle Idler

Complete information on a cradle idler and belt conveyor is contained in a 16-page brochure. The brochure gives a description, photographs, dimensional drawings and capacity table of the idler, the idler H-frames and the belt conveyor. (The McNally Pittsburgh Mfg. Corp.)

For free copy circle No. 9 on postcard

Machining Operations

The extreme capabilities of multiple-spindle bar and chucking automatics performing a wide range of machining operations, are shown in a bulletin. The multitude of normal operations are clearly illustrated in the 39 bar machine and 18 chucking machine applications. (For free copy, write on company

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letterhead to The National Acme Co., 170 East 31st St., Cleveland 8.)

Testing Sieves

A bulletin covers 1960 revised specifications for testing sieves. The bulletin also lists specifications being proposed as international standards. The new specifications combine the former coarse and fine series into a single series. (The W. S. Tyler Co.)

For free copy circle No. 10 on postcard

Space-Saving Fans

An airfoil, centrifugal fan, with in-line air flow, is discussed in a catalog. The 14-page booklet is well illustrated with photographs, construction and installation diagrams, performance curves and tables. (Westinghouse Electric Corp.)

For free copy circle No. 11 on postcard

Rotating Disks

For pelletizing or mixing such materials as ore fines, phosphates and oxides, a line of rotating disks is described in a four-page bulletin. The bulletin cites design features and advantages of the disks. (Dravo Corp.)

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Plastic Vacuum Hose

Informative facts about flexible plastic vacuum hose are contained in an eight-page brochure. The brochure contains diameters, lengths, construction details and present applications of the complete line. (Dayton Dayflex Plastics Co.)

For free copy circle No. 13 on postcard

Thermostats

A bulletin describes the company's line of thermostats which features narrow differentials. The bulletin contains new photographs and drawings, as well as the latest ratings on both semi-enclosed and hermetically-sealed types. (Stevens Mfg. Co., Inc.)

For free copy circle No. 14 on postcard

Screw-Type Pump

The subject of a 39-page booklet is a rotary, screw-type pump. In the pump, fluid is propelled axially in a constant, uniform flow. Its capacities range from 1-4000 gpm. The pump's pressure capacity is 3000 psi. The booklet contains the pump's advantages, applications, specifications, dimensions and performance data. (De Laval Steam Turbine Co.)

For free copy circle No. 15 on postcard

Saw Information

Covered in a 34-page booklet is a brief account of the history, manufacture, variety and uses of saws. The saws dealt with are for the cutting of ferrous and nonferrous metals, hard plastics and rubber, wood and other dense materials. The booklet proves to be a handbook and guide. (Nicholson File Co.)

For free copy circle No. 16 on postcard

Hydrogen Gas

Hydrogen gas production is described in a four-page bulletin. It includes pictures of the compact plant and flow diagram. (The Electric Furnace Co.)

For free copy circle No. 17 on postcard

Cold Heading Machines

A bulletin describes precision cold heading machines for small and miniature parts, and long, thin pins and rivets. Also included are diagrams illustrating the method of making hollow rivets with these machines. (REM Sales Inc.)

For free copy circle No. 18 on postcard

Production Equipment

Capsule case histories of special equipment, to meet the special requirements of the metalworking industry, are contained in an eight-page bulletin. Brief details of machine design and methods are given, along with the production rates. (Kirkhof Mfg. Corp.)

For free copy circle No. 19 on postcard

Firebrick

Two types of firebrick are described in a four-page folder. This includes its advantages, recommendations, arch and wall shapes. Also included is chemical analysis of each brick. (J. H. France Refractories Co.)

For free copy circle No. 20 on postcard

Tool Steel

Dealt with in a 144-page catalog is a complete tool-steel line. The catalog features a simple up-to-date selector for the 24 varieties of tool steel supplied by the company. (For free copy, write on company letterhead to Darwin & Milner Inc., 2222 Lakeside Ave., Cleveland 14)

For free copy circle No. 21 on postcard

SOLD BY THE MILLIONS

KEYSTONE MB SPRING WIRE STUDY

Western Newell Mfg. Co. also supplies a complete line of drapery hooks made from Keystone Forming Quality Wire.

Newell

depends on KEYSTONE WIRE in the production of low-cost spring sash rods

To mass produce low-cost items that sell by the millions to retail stores coast to coast, calls for a quality product with top eye appeal for customer acceptance. Western Newell Mfg. Co., Freeport, Illinois, branch of The Newell Companies, manufactures many such items, including the spring sash rod illustrated. Keystone Drawn Galvanized MB Spring Wire permits continuous, mass-production runs without rejects . . . essential for profitable operation.

Says John H. Hepner, Purchasing Agent for Western Newell, "Keystone helps us produce a better sash rod through their close cooperation in developing and maintaining a wire most suitable for our use."

The most important requirements for manufacturing their sash rod are uniformity of temper throughout the coil, plus the superior silver brite luster of Keystone Drawn Galvanized MB Wire.

Keystone metallurgists carry on a continuous research for better spring wire so that Western Newell can hold a cost advantage. Such service has made this company a long-time user of Keystone MB Spring Wire.

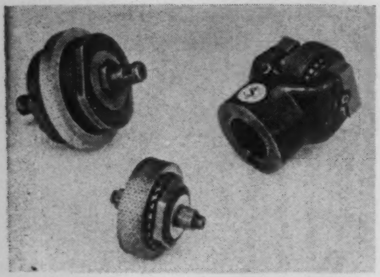
You, too, can take advantage of Keystone's experience to mass produce your product with wire. For more information, talk with your Keystone Wire Representative. He will be pleased to serve you.

Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY

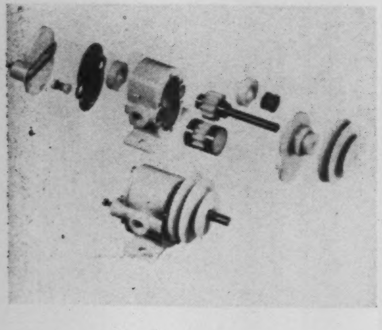
New Materials and Components



Tool Dresses All Kinds of Grinding Wheels

A traverse dressing tool consists of an alloy wheel. Into it are set many diamonds. They are in rows across the peripheral surface. The tool is power driven and electronically controlled with stepless speed variations. The unit also comes as a free-running unit, actuated by the grinding wheel itself. The tool dresses all kinds of grinding wheels on any kind of operation. The rotary and traversing action of the unit enable the user to dress wheels faster with less friction. (Sidley Diamond Tool Co.)

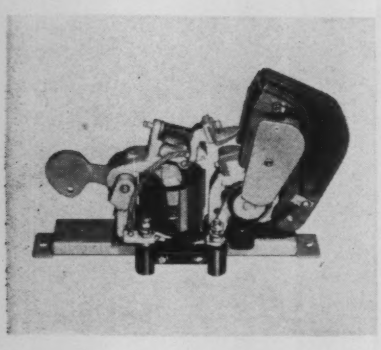
For more data circle No. 21 on postcard, p. 101



Gear Pumps Feature Plastic-Material Design

High efficiency and long service life are advantages of general-purpose gear pumps designed "from scratch" in "Delrin." The plastic design reduces horsepower requirements as much as 50 pct. The pump's long life allows a minimum spare part inventory. The pumps use the plastic for all major parts. Operating advantages include very low heat build-up. The solvent resistance and very low moisture absorption of the molded parts indicate that the pumps may be used over a wide range of applications. Their capacity range is from 2-18.5 gpm. They operate at pressures from 0-100 psi with non-lubricating liquids. (Planet Products)

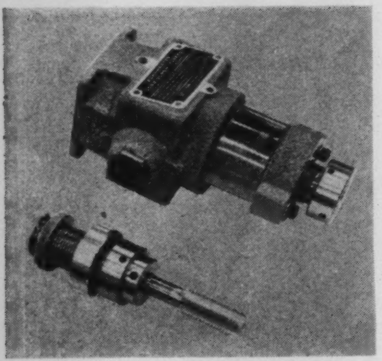
For more data circle No. 22 on postcard, p. 101



Contactors Allow Flexible Mounting of Wire

For use on heavy-duty mill controllers and integrated control systems, dc contactors have unitized design. It is this design that permits three wiring variations. Each contactor is fixed on an insulated steel base. The base can mount directly on either steel or slate supporting panels. This allows either front wiring or rear-of-panel main wiring. Another wiring method is possible by mounting the contactor on a spacer. The wiring is channelled under the contactor. A feature of the line is "piggy-back" interlock assemblies. Pre-drilled mounting holes on the unit base accommodate interlock mounting brackets. (Cutler-Hammer)

For more data circle No. 23 on postcard, p. 101



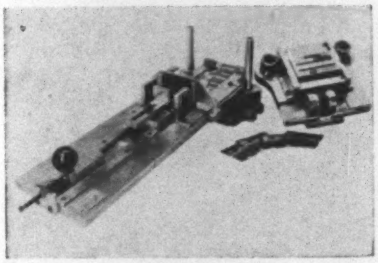
Tapping Head Increases Thread Production

For tapping tough materials and blind holes, a lead-screw tapping head improves the finish and accuracy of tapped threads. The unit eliminates scrap due to pulled or loose threads. The engagement of forward and reverse motions is through multiple-tooth, positive jaw clutches. Quickly interchangeable lead screws are optional for the unit. They come in NF and NC threads from ⅛- through 1-in. diam. The head comes with one lead screw, lead nut and tap collect as standard with lead, collet diameter as desired. The unit is furnished with a timer that allows tapping to depth, and tap retraction from the hole. The head is designed for use on single-spindle equipment. (Burg Tool Mfg. Co.)

For more data circle No. 24 on postcard, p. 101

Unit Feeds and Stamps

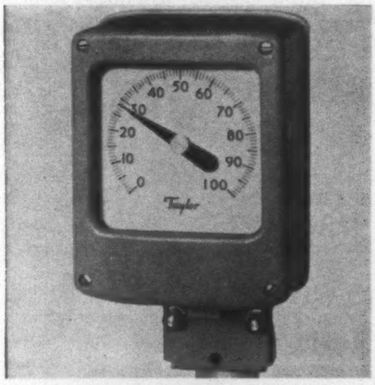
Usable in punch presses with open backs, a feeding and stamping unit takes nameplates up to 4 x 4 in. The addition of an air cylinder and properly interlocked controls can power operate the manually-operated feeder. Plates automatically slide from the bottom of the magazine into stamping position; with each plate automatically ejecting a previously stamped plate. Stamping is in progressive sequence with serial numbering done at one station and fixed data stamped at another station. A complete plate is ejected at each stroke of the press and slide feed. (The Acromark Co.)



For more data circle No. 25 on postcard, p. 101

Pneumatic Transmitter

Highly accurate, a line of pneumatic transmitters provides an input-to-output accuracy of ½ pct. This accuracy is maintained for the measurement of gage pressure, volumetric pressure, temperature and volumetric load. A sealed cartridge servo unit maintains high transmission accuracy under load. Low friction in the sealed indicator-driving mechanism permits a 0.1 pct of input-span sensitivity to low-energy input signals. A 11¾ in. scale pro-



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As the leading producer of precision turned brass and aluminum nuts, Fischer combines in-plant tolerances that exceed industry standards, electronic order processing systems and unique custom machinery to assure you of premium quality . . . on-schedule delivery . . . competitive pricing on each job.

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SINCE 1905

there's no premium for precision at Fischer

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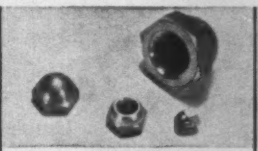
MACHINE SCREW



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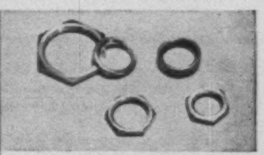
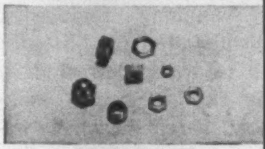


PANEL/SWITCH



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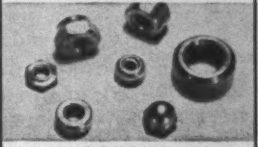
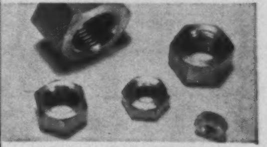


SPECIAL



SEMI-FINISHED

If you use stainless steel plate

this new booklet on Carlson services in stainless steel gives you worthwhile facts!

This new Carlson Booklet, "Producing Stainless Steels . . . Exclusively," documents a unique, specialized service. Fully illustrated, it includes detailed sections on stainless steel plates, heads, forgings, special shapes, and other stainless products manufactured by Carlson.

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for your personal copy of
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G. O. CARLSON, INC.
120 Marshallton Road
THORNDALE, PENNSYLVANIA

I would like a copy of the new Carlson Booklet.

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Company Name____________________

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City____________State____________

vides an indication accuracy within 1 pct of actual value of the variable being measured. (Taylor Instrument Companies)

For more data circle No. 26 on postcard, p. 101

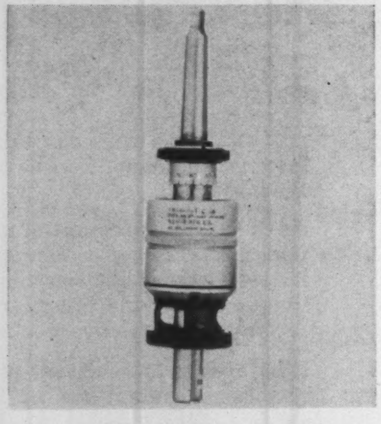
Fiber Glass Pulleys

Molded nylon fiber glass pulleys are combined with metal-reinforced inside flanges. These pulleys have a 2.45:1 infinitely - variable speed range. They also offer spring-loaded tension and ⅜- to ⅝-in. solid or hollow shaft bores. (Rampe Mfg. Co.)

For more data circle No. 27 on postcard, p. 101

Internal Recessing Tool

In automatic internal recessing, a tool has the capability for wide face or multiple-form grooves. It also features deep-grooving capabilities; no limitations on groove position. The tool can back spotface to a maximum diameter of two times the hole diameter. The tool pilots directly in the part for employment with any machine tool without special fixturing. (Nobur Mfg. Co.)



For more data circle No. 28 on postcard, p. 101

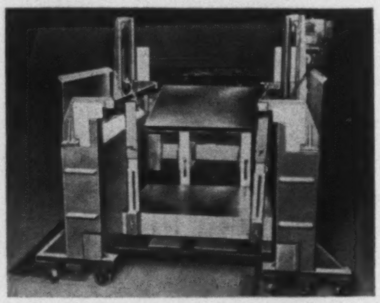
Die-Casting Quench

Usable for both aluminum and zinc castings, a die-casting quench eliminates scumming, foul odor, chip and dirt flotation and blistering rejects due to water corrosion. It requires no heating, special tanks or equipment. It remains stable under production heat build-up. The quench leaves a water-repellent residue. The residue prevents oxidation of parts held in storage as long as three months. (Northwest Chemical Co.)

For more data circle No. 29 on postcard, p. 101

Stacking Device

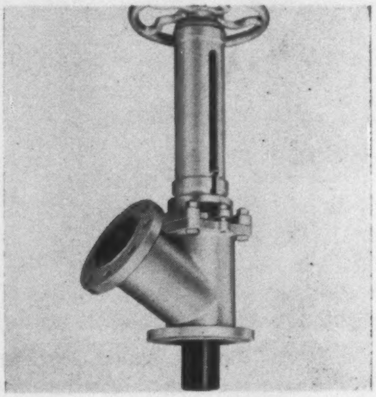
A standard, adjustable stacking device can make neat stacks of sheets on pallets, skids or dunnage. The stacker has sides that adjust in or out for width variations. It also has back guides that adjust forward or backward to accommodate various sheet lengths. The sides swing out from the center for access to remove completed stacks. The unit can be used behind such operations as: shearing, blanking, and dry film coating. (Die & Automation, Inc.)



For more data circle No. 30 on postcard, p. 101

Drain Valves

With all valve internals machined from impervious graphite, a line of drain valves provides almost universal corrosion resistance. The valves use a piston closure, without seats. As a result, the valves cannot be over tightened. Piston position is externally indicated for convenience and safety. Standard



309
309S
309SCb
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316L
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317L
D319
D319L
17-4 PH*
17-7 PH*
PH 15-7 Mo*

Only Carlson produces all plate thicknesses in all these superior grades of stainless steel

In addition to the more usual grades, Carlson regularly produces stainless steel plate and plate products in this wide range of superior analyses in any thickness. Many of these grades are included in our mill inventory; the others can be rolled to your order.

These chromium-nickel analyses were developed to more closely match the exact requirements of process, nuclear, and space equipment. Each has one or more of the following advantages: increased corrosion and/or heat resistance, good machinability, ease of fabrication, and exceptionally high physical properties with low temperature heat treatment. By selecting the grade that gives you the combination of advantages you want, your costs can be reduced and the trouble-free life of your equipment extended.

Write today for details on these superior grades and for inventory information on all types of stainless steel plates and heads.

*Trade marks of Armco Steel Corporation

C

G.O.CARLSON Inc.
Producers of Stainless Steel
120 Marshalton Road
THORNDALE, PENNSYLVANIA
District Sales Offices in Principal Cities

Plates • Plate Products • Heads • Rings • Circles • Flanges • Forgings • Bars and Sheets (No. 1 Finish)

ASA flanges permit convenient mounting. Bodies are cast iron. (Falls Industries, Inc.)

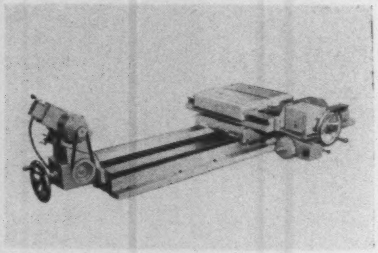
For more data circle No. 31 on postcard, p. 101

Lubricant

Containing modified molybdenum disulfide compound, a lubricant also consists of other additives that are suspended in a synthetic base vehicle. The vehicle evaporates and leaves a durable dry film of solid lubricating compound. It does this on most metal surfaces, preventing galling, seizing, fretting corrosion and cold welding. The nonflammable lubricant is specially formulated for use under high-pressure, high temperature conditions up to +750°F. (Hohman Plating & Mfg. Co.)

For more data circle No. 32 on postcard, p. 101

Feed Tables



Powered, erector-type feed tables and slides range in size from 9 in. to 2 ft wide. Longitudinal travel is up to 15 ft. Standard models provide electric, hydraulic and pneumatic power as well as manual feeds. The tables feature precision movement; scraped, dovetail ways; utmost rigidity. Uses include the positioning or feeding of workpieces and machining units. (Master Mfg. Co., Inc.)

For more data circle No. 33 on postcard, p. 101

Paints Fight Rust

Rust-inhibitive paints feature cationic action. The coatings combine the proven strength and adhesion qualities of epoxy resins with a rust-fighting action. The coatings penetrate through bare metal and deposit a rust-preventive film. (The Garland Co.)

For more data circle No. 34 on postcard, p. 101

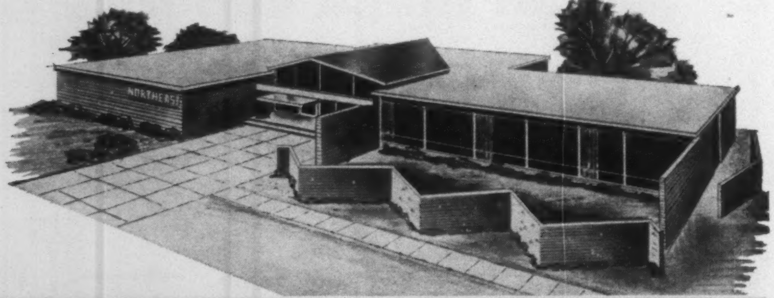
NORTHEAST
Ohio Machine Builders, Inc.

SPECIAL MACHINERY AND EQUIPMENT FOR THE METALS INDUSTRIES

Northeast is staffed with a highly competent team of sales engineers, design engineers, purchasing and production specialists. All have been closely associated . . . having worked together as a coordinated team for a number of years. Engineers are professionally trained, with backgrounds in industry, and have wide experience in designing and building special machinery where exacting and unusual requirements are to be met.

One or more of these qualified specialists will, at your request, call upon you to discuss your operation. There is no obligation, of course.

- Friction and Hot Sawing Machines
- Conveyors—pipe, plate, billets, sheet & strip
- Mechanical equipment for Furnaces
- Cooling Beds, Transfer Tables
- Automatic Handling Tables for pipe, plate, sheet & strip
- Pipe Stenciling, Weighing & Measuring Machines
- Tension & Payoff Reels
- Sheet & Plate Levellers, Descalers
- Shears
- Cleaning Lines
- Special Machine Tools
- Hot & cold tube spinning machines
- Bar turning machines, Straighteners
- Expanded Metal Machines



NORTHEAST OHIO MACHINE BUILDERS, INC., 330 North Main St., Columbiana, Ohio

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Tool Rotating
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

HOT DIP GALVANIZING
JOSEPH P. CATTIE & BROTHERS, INC.
2520 East Hagert St.
Phone: RE 9-8911 Phila. 25, Pa.

STEELMAKING AT JESSOP

175,000 pounds x 150 mph = shock treatment

The powerful jet engines whine in reduced-throttle restraint as the big, sleek aircraft maneuvers gracefully in its approach pattern.

In the cockpit, the crew goes through a check list. At one point the wheels are lowered and three green lights appear, indicating the gear is in position.

Then, a moment later, the pilot eases the 175,000 pound aircraft traveling 150 miles per hour onto the concrete—safely, surely, with confidence.

Probably, the steel in the landing gear was forged by Steel Improvement & Forge Company of Cleveland. For those components that bear the brunt of the impact, Steel Improvement purchases a Macro-Clean alloy made exclusively by Jessop at its Green River plant.

Only Jessop has it, this tough, sound-centered Macro-Clean alloy that takes in stride the transverse shock imposed on aircraft landing gear.

And the excellent physical properties inherent in Macro-Clean alloys make them ideally suited for numerous other applications too—crankshafts, gears of all kinds, pellet mills, driveshafts, large bearings and oil field goods for example.

Call any of Jessop's 23 sales offices in North America for Macro-Clean aircraft and forging quality alloys and a full range of specialty steels.

Jessop Steel Company
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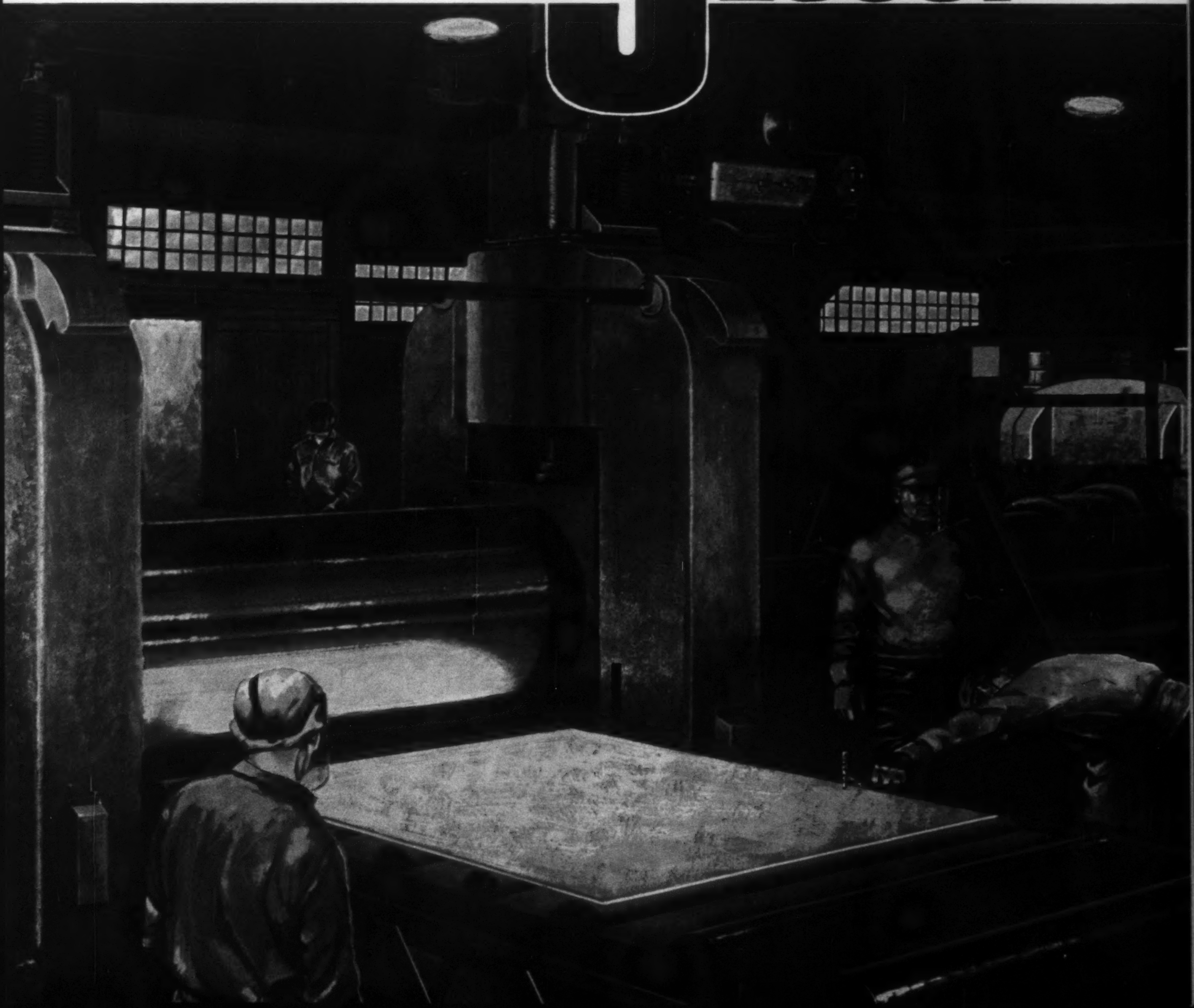
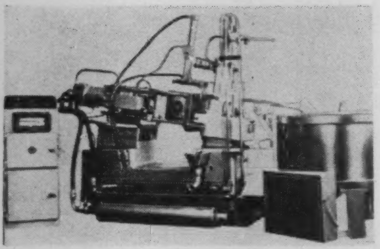
JESSOP



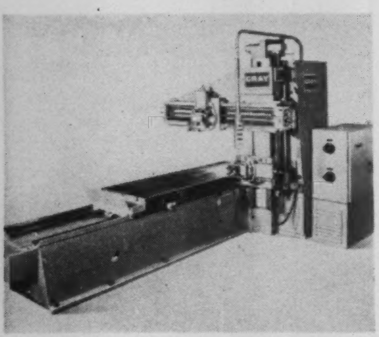
New Equipment and Machinery



Die Casting Machine Features Safety System

Fully automatic, a zinc die casting machine has an ultra-sensitive pressure switch with infinite adjustment. The switch is in series with a wide tolerance switch which feels foreign matter, flash or a stuck casting between the dies as they lock up. Any unejected casting or foreign matter will at once cause the die to retract and stop the cycle. The machine averages 1500 shots per hour. (DCMT Sales Corp.)

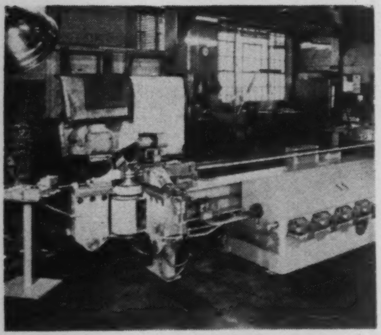
For more data circle No. 40 on postcard, p. 101



Planer Has Rugged, Square-Locked Components

Designed and built for fast carbide planing, a planer has single or double cutting heads. The planer's square-locked parts resist torsional deflection and vibration produced in double cutting. A pendent station affords complete control of table movement. A 60-75 hp variable-voltage drive powers the unit. The motor is adjusted, in the cut and return direction, from 180-1800 rpm. Standard planer ratio of 6:1 provides table speeds of from 30-300 fpm. Optional, non-metallic table ways increase load-carrying capacities. They permit higher cutting speed. The ways consist of laminated plastic plates. (G. A. Gray Co.)

For more data circle No. 41 on postcard, p. 101



Machine Bends and Cuts in Four Seconds

A bending and cutting machine performs its entire operation in just four seconds. After a determined amount of tube has been slipped over the mandrel, a button starts a completely automatic cycle. It continues until all the tube has been used. The tube then readies itself to be advanced to the stop. A sliding pressure die engages the tube and advances it. The tube becomes securely clamped. This instantly starts the bending arm which rotates to the stop. The pressure die and mandrel are then withdrawn. This starts the sawing cycle. After the sawing cycle, the clamp releases. Air exhausters eject the tube. (Wallace Supplies Mfg. Co.)

For more data circle No. 42 on postcard, p. 101

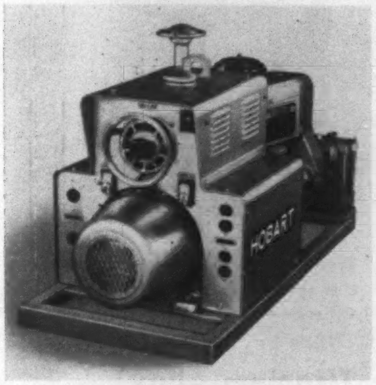
System Measures Elongation of Cold-Rolled Strip

At low and high speeds, a digital extensometer easily measures the amount of elongation of cold-rolled strip as it passes between the work rolls of a reduction mill. Simple digital instruments accomplish this. They consist basically of high reliability solid-state devices. The extensometer improves hardness control techniques for steel mills producing sheet and tin plate. Surface hardness is related to elongation when the strip is cold rolled in a reduction or temper pass mill. The system computes and displays continuously the amount of elongation, in percent. Two heavy-duty magnetic type pulse generators measure elongation. They are geared to two contact rolls located at the entry and exit side of the mill. (Allis-Chalmers Mfg. Co.)

For more data circle No. 43 on postcard, p. 101

Welder and Power Plant

A combination dc welder and ac power plant provides 200-amp dc, at 25 v, on 100-pct duty cycle for straight or reverse polarity welding. It has a welding range of 30-325 amp for intermittent use. Power output is 2 kw at 110-v ac of auxiliary power when welding. Power output is a full 5 kw of 110/220-v ac current when the unit works as a generating plant. (Hobart Bros. Co.)



For more data circle No. 44 on postcard, p. 101

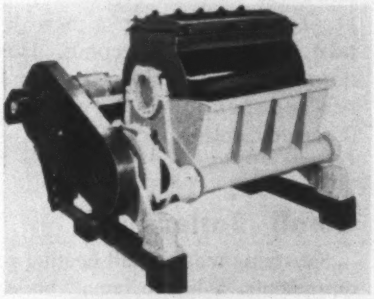
Roof Ventilators

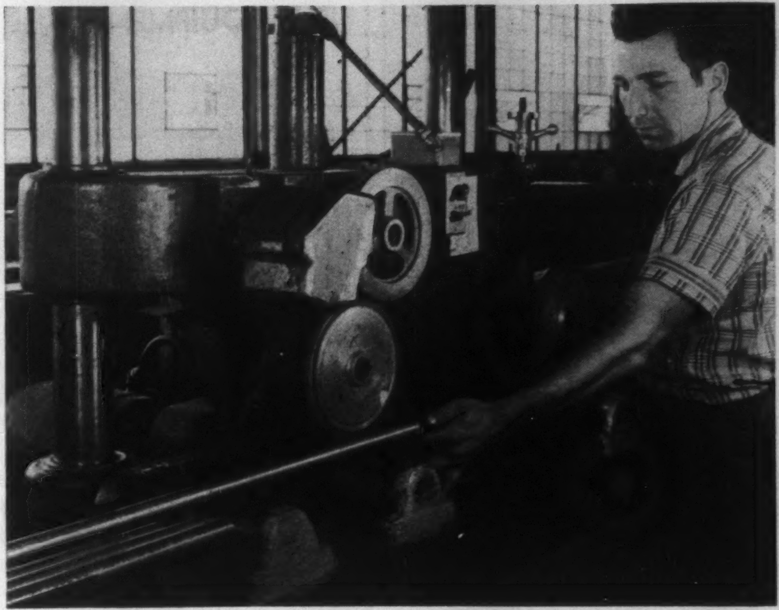
Solid plastic roof ventilators remove corrosive fumes. Upblast discharge blows the fumes high into the air. This minimizes corrosion to nearby roofs and ground areas. It also reduces chances of fumes reentering the plant. (Heil Process Equipment Corp.)

For more data circle No. 45 on postcard, p. 101

Vibrator Finishers

For every size and shape part, a vibrator finisher provides deburring, descaling, burnishing and coloring operations without marring or distortion. The unit deburrs, descales and finishes the inside sur-





This Pannier Offset Bar and Tube Printer at the Superior Tube Company, Norristown, Pennsylvania, is shown marking tubing. The tubing moves from the marker right to a delivery table, ready to bundle for shipment.

MARK BARS, EXTRUSIONS AND TUBING QUICKLY, CLEARLY FOR EASY IDENTIFICATION

The Pannier Offset Bar and Tube Printer marks tubing clearly at a controlled rate of up to 450 feet per minute in a wide range of sizes. It is designed to handle rounds from ⅛" O.D. to a maximum size of 14" O.D. Simple adjustments compensate for the various sizes of material to be marked, including flats up to 4" wide. Adjustable side guide rolls are available as optional equipment to permit printing on flat material from 4" to 14" wide.

Top surface printing permits constant inspection. Fast drying inks permit immediate handling. The standard offset printer is right-hand feed; left-hand feed is available to fit your conveyor line system without disrupting present line movements.

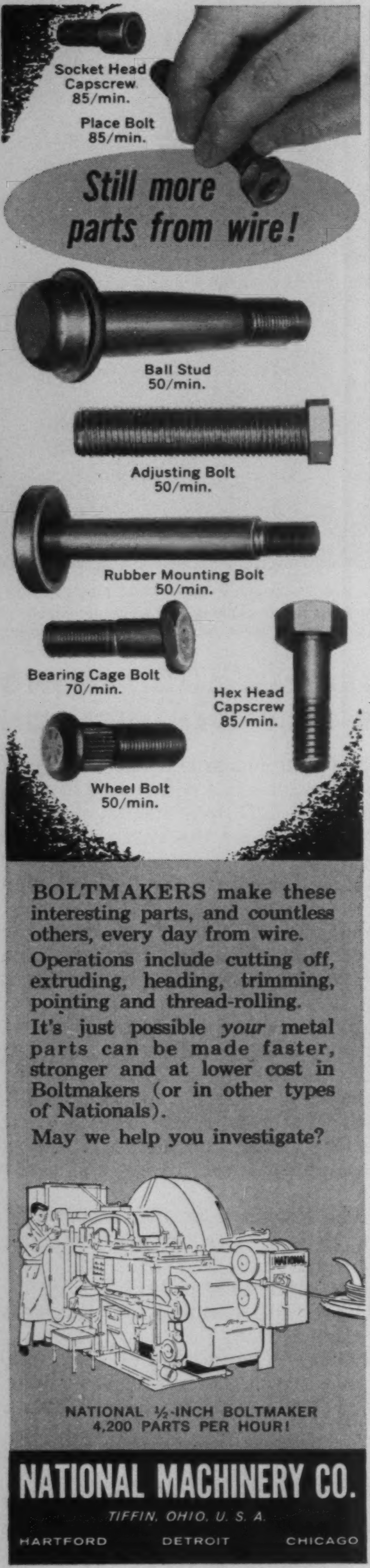
This unit (Model 8) will print a 24" continuous legend; Model 12 will print a 36" continuous legend using either premolded rubber dies or changeable type, which range in size from 1/16" to 2½" characters. Fast type setting saves valuable production time and speeds up deliveries. Printing components, which include the die wheel, printing wheel and drive wheel, are available in three sizes, depending on size of the characters desired. Printing components are quickly and easily interchanged.

The Pannier Offset Bar and Tube Printer is available with a ¾ horsepower variable speed motor, or is friction driven from your existing conveyor for continuous flow materials. The power unit has a magnetic starter that activates motor as material passes through the limit switch. This eliminates excessive ink build-up on the offset printing wheel, and assures clean, clear marking.

Pannier also has a small model Offset Wire Bar and Tube Printer, which is recommended for printing materials less than 4" O.D. Pannier engineers will be glad to consult with you on all your marking problems. For complete information, write:

PANNIER MASTER MARKERS
206 Pannier Building
Pittsburgh 12, Pa.

MASTER PANNIER MARKERS


Socket Head Capscrew 85/min.
Place Bolt 85/min.
Still more parts from wire!
Ball Stud 50/min.
Adjusting Bolt 50/min.
Rubber Mounting Bolt 50/min.
Bearing Cage Bolt 70/min.
Hex Head Capscrew 85/min.
Wheel Bolt 50/min.

BOLTMAKERS make these interesting parts, and countless others, every day from wire.

Operations include cutting off, extruding, heading, trimming, pointing and thread-rolling.

It's just possible *your* metal parts can be made faster, stronger and at lower cost in Boltmakers (or in other types of Nationals).

May we help you investigate?

NATIONAL ½-INCH BOLTMAKER
4,200 PARTS PER HOUR!

NATIONAL MACHINERY CO.
TIFFIN, OHIO, U. S. A.
HARTFORD DETROIT CHICAGO

face and hard-to-get-at areas regardless of size openings. The finisher's drums are easily interchangeable. They come in many varied sizes. The vibrating mechanism is positive eccentric with adjustable stroke. (Productive Equipment Corp.)

For more data circle No. 46 on postcard, p. 101

Heat-Treating Unit

Designed for flexibility, a two-in-one combination heat-treating unit is easily portable. The transformer-type electrical heater serves well for both induction and resistance heating. The unit readily stress relieves pipe weld in 2-14 in. OD pipe; with wall thicknesses up to 2 in. at temperatures to 1375°F. (Electric Arc, Inc.)

For more data circle No. 47 on postcard, p. 101

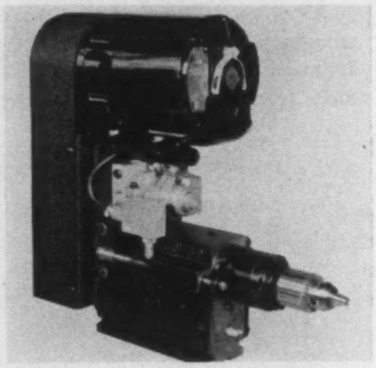
Ultrasonic Cleaning

For production cleaning of small parts and sub-assemblies, a compact ultrasonic cleaning system is powered by a 75-w generator. The generator drives a transducerized tank at a nominal frequency of 25 kc. To operate the unit at peak efficiency, only two simple controls are needed. (Branson Instruments, Inc.)

For more data circle No. 48 on postcard, p. 101

Drilling Unit

Air powered and hydraulically controlled, an automatic drilling unit develops a 3-to-1 thrust. It has a 3-in. stroke and is capable of drilling holes up to ½-in. diam in cast iron. The full hydraulic control is integral. It is externally adjustable for rapid approach, rate of feed and length of stroke. The air power thrust and hydraulic counter thrust are applied along the centerline of the quill. (The Govro-Nelson Co.)



For more data circle No. 49 on postcard, p. 101

Titanium Alloy

A creep-resistant titanium alloy extends titanium's useable strengths in jet engines to 900°F. The new alloy contains 8 pct aluminum and 1 pct each of molybdenum and vanadium, in addition to 90 pct titanium. Dies and forging practices, used for forging other titanium alloys, can be used in production of parts manufactured from the new alloy. (Titanium Metals Corp. of America)

For more data circle No. 50 on postcard, p. 101

Pressing and Staking

A unit combines pressing and staking in a one-cycle automatic operation. A single foot switch replaces the hand lever for pressing and the hand release for staking impact. Air at controlled pressure drives the ram downward to hold down the parts or secure a press fit. Tool changes for a new job take less than 15 seconds. Hold down pressure and staking force are independently adjustable. (Cramer Controls Corp.)

For more data circle No. 51 on postcard, p. 101

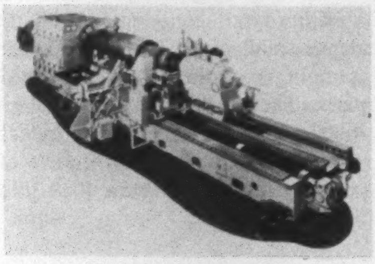
Small Boilers

Satisfying many small heating requirements, a line of small boilers finds use in industries requiring process steam. The line's six models range from 16-60 bhp. Steam capac-

ities per hour are from 518-2070 lb. The boilers reach full power within 15-20 minutes from a cold start. (Cyclotherm Div., Crane Co.)
For more data circle No. 52 on postcard, p. 101

Contour Roll Lathe

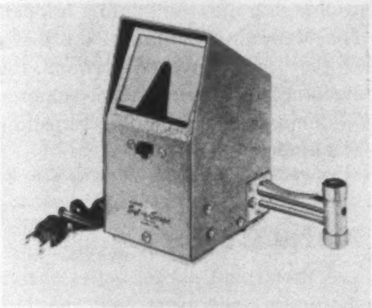
For a hot strip mill, a large roll turning lathe is designed to swing rolls 70½-in. diam and 24-ft long. The lathe can take a maximum weight of 140 tons on centers at speeds of 1.3-228 rpm. (The Youngstown Foundry & Machine Co.)



For more data circle No. 53 on postcard, p. 101

Small-Parts Inspection

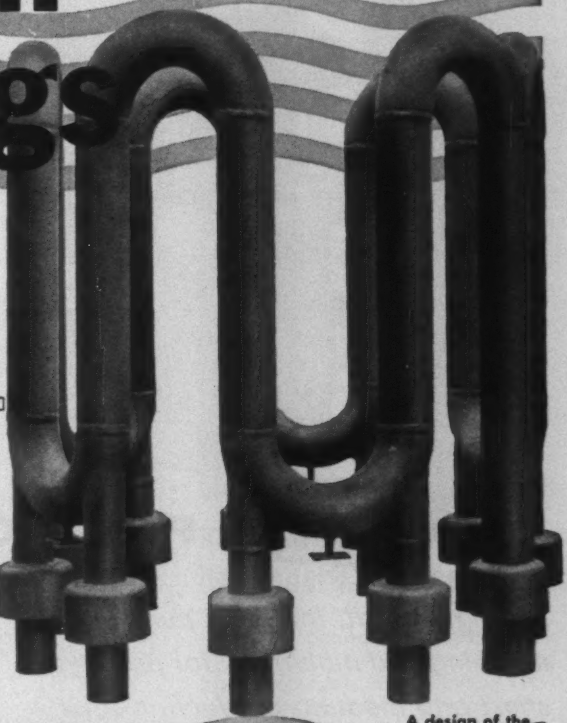
To provide rapid, precise examinations of the points and tips of very small parts and tools, an optical instrument shows a magnified, illuminated image. The image is on a ground glass screen. Flaws and wear are recognized at once. (Robins Industries Corp.)



For more data circle No. 54 on postcard, p. 101

Briquetting Press

Fully automatic, a briquetting press finds its power in three 125-hp electric motors. The unit is capable of converting up to 9 tons of machine-tool scrap per hour into cylindrical briquettes. The briquettes have a density of 80 pct. Individual briquettes weigh from 30-40 lb



when things are HOT.. call on Duraloy

A design of the A. F. Holden Co. Detroit, Mich.

Castings that Keep their Load-Carrying Strength at High Temperatures

This "immersion type radiant heater" is typical of the high reliability castings turned out by DURALOY. Centrifugally cast tubes with *UNIFORM* wall thickness...for longest service life. Static cast collars and shell molded bends...typical of DURALOY versatility.

For your high alloy casting requirements check with DURALOY... our long experience, ultra-modern foundry and up-to-the-minute test equipment will be helpful in solving your problems. For more information ask for Bulletin No. 3150 G.

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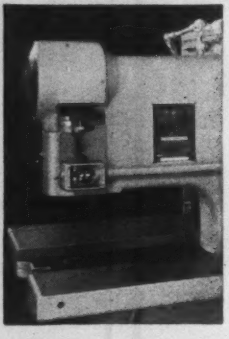
NEW... IMPROVED... model 15A

the STRIPPIT
FABRICATOR

for high-profit, low-cost punching, notching and nibbling... for prototype, short and medium production runs



FEATURING the new *Strippit Electro-Hydramatic Head* — simplified design... minimum number of parts... needs no pressurized air. Makes the 15A easier to install, simpler to maintain, more economical to operate.

punches
any round or shaped hole up to 3½" diameter in sheet material — up to ¼" mild steel.

notches
90° corners — rectangular, radii, vee and special shape edge notches — up to ⅛" capacity in mild steel.

nibbles
straight line or contour shearing up to 38" diameter circle, at 165 strokes per minute, ⅛" mild steel.

accurate, quick-set gauging
a unique, multiple-stop system for exact work positioning to any layout specifications — *in seconds.*

quick-change punches and dies
from one size to another in less than 20 seconds — within easy reach in labeled, built-in file drawers.

easy conversion
to a high speed production punching unit with the Strippit Duplicator and the Dupl-O-Scope or Microbars to punch Duplicator templates.

WRITE TODAY
for new Catalog 15A and demonstration at your own plant of the capabilities of this high-profit fabrication system.

A UNIT OF HOUDAILLE INDUSTRIES, INC.

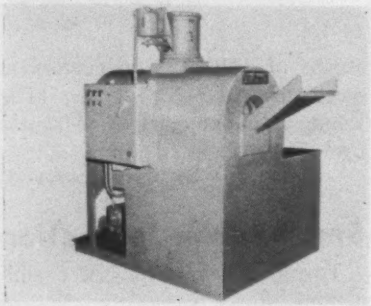
WALES **STRIPPIT** INC.
202 Buell Road • Akron, New York
In Canada: Strippit Tool & Machine Company, Brampton, Ontario

each. Cylinder pressure plates and die holders are cast steel. (Milwaukee Foundry Equipment, Div. of SPO, Inc.)

For more data circle No. 55 on postcard, p. 101

Cleaning Machine

Just 5-ft long and 4½-ft wide, a drum-type cleaning machine cleans small parts. It is suitable for stampings, castings and machined parts. The machine has a variable-speed drive. This drive provides capacity ranging from 6-9 cu ft of parts per hour. The parts load into the machine manually, from the shop containers or from a conveyor discharging into the loading hopper. The "tumbling" action of the parts, as they are conveyed through the machine, insures efficient cleaning. (Cincinnati Cleaning & Finishing Machinery Co.)



For more data circle No. 56 on postcard, p. 101

Metal Cutter

A metal and plastic cutter shears aluminum, engravers and jewelers brass; also, any flexible plastic engraving stock. Machine construction is very sturdy. The cutter has a honed steel blade and great leverage. The cutter produces a cut which is absolutely straight. The edge is smooth, and there is no distortion. (Hermes Plastic, Inc.)

For more data circle No. 57 on postcard, p. 101

Belt Head Machine

Greatly-increased belt life is a feature of an abrasive belt head machine. The abrasive belt travels on a resilient driven back-up belt.

A steel platen supports it at work position. The large table top may be used horizontally, or tilted to produce a chamfer or beveled edge on the work. It can also be positioned so as to provide an angular surface in relation to a second surface. (Murray-Way Corp.)

For more data circle No. 58 on postcard, p. 101

Gas Lift Truck

Of very rugged construction a 20,000-lb capacity, cushion-tire gas lift truck is able to work in standard box cars. The truck features a 110-in. turning radius, a 95-in. overall height and an overall length of 125 in. Standard equipment includes: power steering, vacuum-powered brakes and a two-speed, fully-automatic torque transmission. (The Yale & Towne Mfg. Co.)

For more data circle No. 59 on postcard, p. 101

NEW BOOKS

"Welding Metallurgy" is a condensed textbook on ferrous and nonferrous welding metallurgy. It proves invaluable for all training programs where the fundamentals of welding metallurgy are involved. The pocket-sized booklet covers: temperature changes in welding; structure of metals; mechanical properties of metals; factors influencing the properties of metals, nickel and nickel alloys, titanium and titanium alloys and many others. 45 illustrations, 25 tables and 25 diagrams. 122 pages. $2.00 per copy. AWS Information Center, 33 West 39th St., N. Y. 18.

"Cast Metals Handbook" enables the user of cast metals to select the material best suited for his purpose. The handbook gives reliable working data for using the properties of cast metals to the greatest engineering advantages. In addition, practical, up-to-date facts on how to get the most out of casting designs are given. Some of the new sections included in the book are: casting design; heat treatment of gray iron; cross index of equivalent ferrous and nonferrous casting alloy specifications. $12.00 per copy. American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Ill.

"Accounting Guide for Defense Contracts," by Paul M. Trueger, provides valuable help in the complex field of defense contract accounting. The author guides you through the intricate phases and questions encountered when dealing with defense contracts. Both the government and industry position are given. What to look for, what is required, what the government expects in the way of cost accounting records and the government's position on allowable and unallowable items are all presented in the book. 600 pages. $15.00 a copy. Commerce Clearing House, Inc., 420 Lexington Ave., N. Y. 17.

WASHERS with old world craftsmanship manufactured by modern methods

Even in products regarded as "ordinary," like washers, there are differences. Differences that can cause trouble or create lasting satisfaction, as the case may be. *Milwaukee Wrot Washers* are better. Let us tell you why:

Washers and stampings have been our sole business for almost 75 years. We are the world's largest producer of washers . . . in the industry's most efficient plant . . . located in Milwaukee, the "Workshop of America" . . . with continuous family ownership and management, and highly skilled workers.

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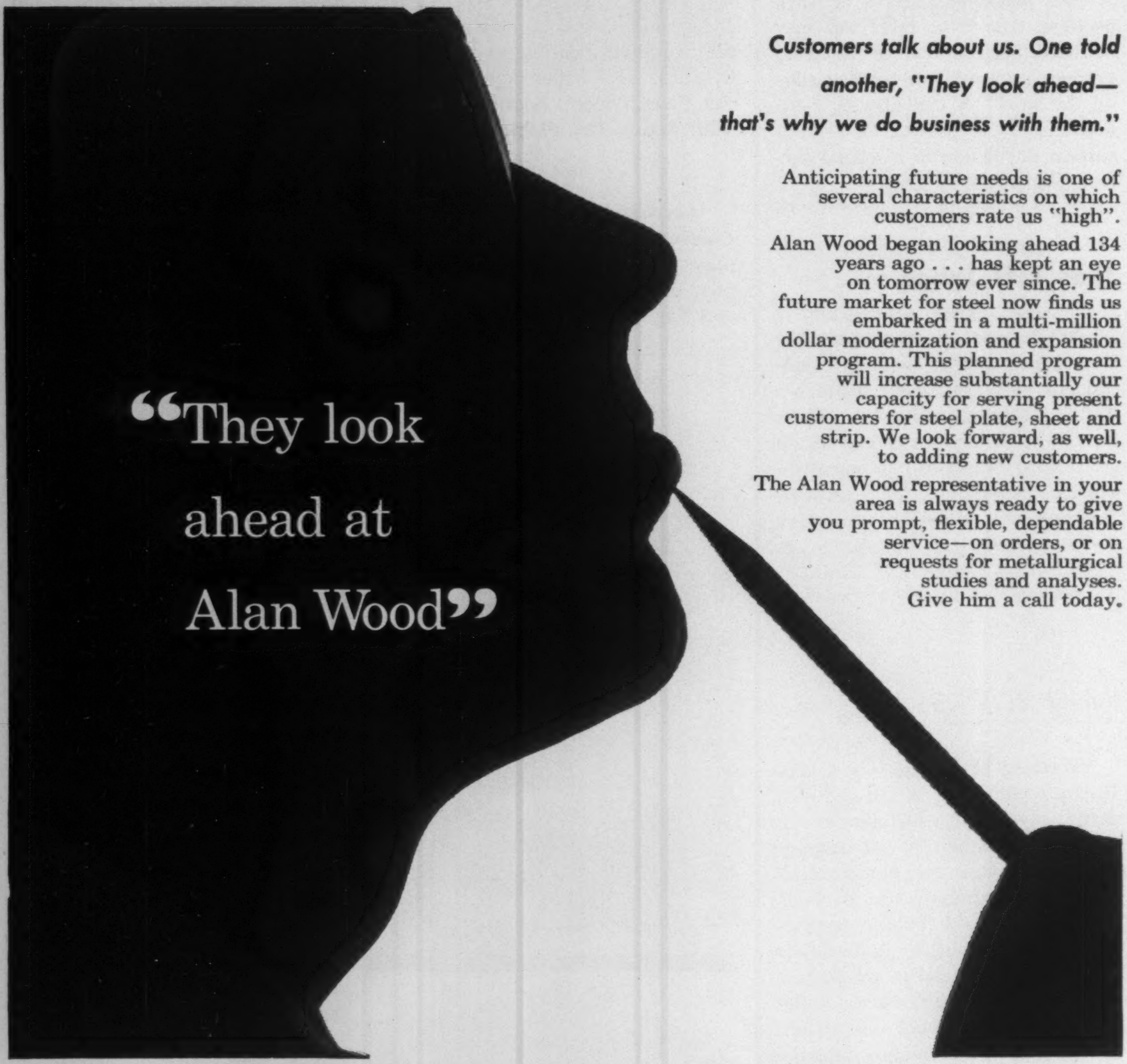
WORLD'S LARGEST PRODUCER OF WASHERS



Customers talk about us. One told another, "They look ahead—that's why we do business with them."

Anticipating future needs is one of several characteristics on which customers rate us "high".

Alan Wood began looking ahead 134 years ago . . . has kept an eye on tomorrow ever since. The future market for steel now finds us embarked in a multi-million dollar modernization and expansion program. This planned program will increase substantially our capacity for serving present customers for steel plate, sheet and strip. We look forward, as well, to adding new customers.

The Alan Wood representative in your area is always ready to give you prompt, flexible, dependable service—on orders, or on requests for metallurgical studies and analyses. Give him a call today.

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The Iron Age Summary

Profit Squeeze Takes Effect

Higher costs of operations brought about by market pressures and higher wages tighten profits.

In turn, this will put the pressure on prices. But increases are not likely in the easy market.

▪ A further squeeze is ahead on steel profits. Low profit margins, and some losses, in the third quarter (See p. 50) will come under even greater pressure in the months ahead.

The low profit outlook is caused by these factors:

1. Higher labor costs following the general pay raise to steelworkers Dec. 1.

2. More costly, shorter rolling schedules as mills try to provide faster service in a period of small orders.

3. The high cost of carrying inventories of semi-finished, and, in some cases, finished steel to provide fast delivery.

4. The disturbing prospect of operations dropping further in the next few weeks.

Price Pressure Builds Up—These factors contributing to higher costs bring greater pressure on the price structure. But, in spite of this, the chances of a general price increase until the market strengthens are small.

There are some new indications of price weakness. While these exist, steel producers are not likely to raise prices, even in the face of higher costs in the next two months.

Weaknesses Show — These are the developments on the price front:

Tinplate users have not been notified of any price increase. Producers notify their customers 35 days in advance of any price change.

Some stainless steel prices were cut in the past two weeks in competitive moves to pick up some increased tonnage.

Price cutting is reported by converters on reinforcing bars and some structural steels.

Some automotive tonnage has been set back from November to December. This means that the large automotive users are at least fairly confident there will be no general price increase.

Referring back to tinplate, it should be pointed out that producers have very high inventories. They point out that they could ship through December with tinplate that had been produced before the Dec. 1 wage increase.

Market No Stronger—All these price comments are based on assumption that a major upsurge in steel demand will not take place this year. If and when steel demand reaches a level that will sustain a price increase, steel companies will increase their prices in line with increased costs. This will probably occur when steel operations approach 70 pct of capacity.

However, the uptrend is not likely to come until well into 1961. The short-term indications show little change in the overall market. If anything, it is a little weaker. Automotive setbacks from November to December are destined to hurt mills which are heavily in the automotive market. Up to now, they have enjoyed better sales than the overall pattern.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,473	1,545	1,522	368
Ingot Index				
(1947-1949=100)	91.7	96.2	94.7	22.9
Operating Rates				
North East Coast	55.0	57.0*	66.0	12.0†
Buffalo	58.0	60.0*	18.0	0.0†
Pittsburgh	47.0	48.0*	46.0	30.0†
Youngstown	42.0	43.0*	46.0	10.0†
Cleveland	57.0	57.0	59.0	0.0†
Detroit	63.0	73.0*	71.0	24.0†
Chicago	51.0	56.0	58.0	5.0†
Cincinnati	60.0	61.0	62.0	86.0†
St. Louis	77.0	78.0*	82.0	92.0†
South	53.0	51.0*	45.0	12.5†
West	45.0	49.0	54.0	16.0†
U. S. Rate	51.7	54.2	53.4	13.0

*Revised †IRON AGE Estimate

Source: American Iron and Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.32	$66.32	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$28.17	$29.50	$29.83	$46.17
No. 2 bundles	$18.50	$19.83	$20.17	$31.50
Nonferrous				
Aluminum ingot	26.00	26.00	26.00	26.80
Copper, electrolytic	30.00	30.00	33.00	30-31.5
Lead, St. Louis	11.80	11.80	11.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	104.00	103.125	102.875	101.25
Zinc, E. St. Louis	13.00	13.00	13.00	12.50

Electric Control Prices to Hold

Electrical control manufacturers feel that there will be no immediate price hikes.

In most cases 1960 sales are on par with 1959, but in some instances are lower.

■ Electrical controls sales this year are holding close to 1959, in some cases down a bit. A slumping appliance field and reductions in capital investment by some segments of the electrical industry compared to a year ago are not helping matters.

There has been price stability for equipment such as motor starters, relays and switches. No changes are seen during the rest of the year. But this idea might change.

Electrical component suppliers still talk about the possibility of a steel price rise. They believe an increase, unless very small, would be followed by bigger prices for products such as switch boxes, conduit and other electrical and power control items.

Fast Deliveries—On the other hand, recent declines in copper prices are being analyzed by electrical parts makers, especially those whose content of this material is high. Suppliers and component makers say they are having no trouble making delivery of electrical controls to customers, especially in standard catalog items.

The electronic computer field continues to show much spunk and growing competitiveness. IBM still leads in sales, reportedly with over three-fourths of the business. Others have eyes on this spreading market and hope to cut IBM's share to 50 pct in a few years.

Military Demand—The big part of electronic controls still goes to the armed forces. Defense accounts for over 80 pct of U. S. electronic equipment output. But industrial and commercial electronics are picking up rapidly. In the past year companies have been preparing for this by spending millions on bolstering sales staffs and stepping up marketing programs.

Electronics industry employment this year is around one million compared to 700,000 five years ago. Total electronic industry sales will go over $10 billion this year, four times as great as 1950. But military output remains the core of the industry, over half of all sales going to the armed forces.

Crew Cut — One new defense project involves a study of the Navy to turn over many control jobs to automated machinery. Aim is to simplify and centralize shipboard operations, cutting down the number of crewmen.

An aim of the industry, however, is to try to lessen its reliance on the military. One worry is that concentration on military sales could prove bothersome if electronic defense programs were cut back, although they are not expected to be.

The automotive industry expects the use of advanced electronics to its products will expand at a tremendous rate throughout the next decade. A sign of this thinking was the entry in August of Ford Motor Co.'s Aeronutronic Div., at Newport Beach, Calif., into the field of automotive electronics.

As for current trends in automotive electricity, predictions are that in two years the alternator will have replaced the generator in all U. S. cars. All 1961 Chrysler Corp. cars have alternators, which appeared for the first time on the 1960 Valiant.

BOREMATION

IN BOREMATION: Workman operates a Boremation "Electra" gun-drilling boring machine equipped with a General Electric numerical positioning control. It automatically drills precision holes with one stroke.

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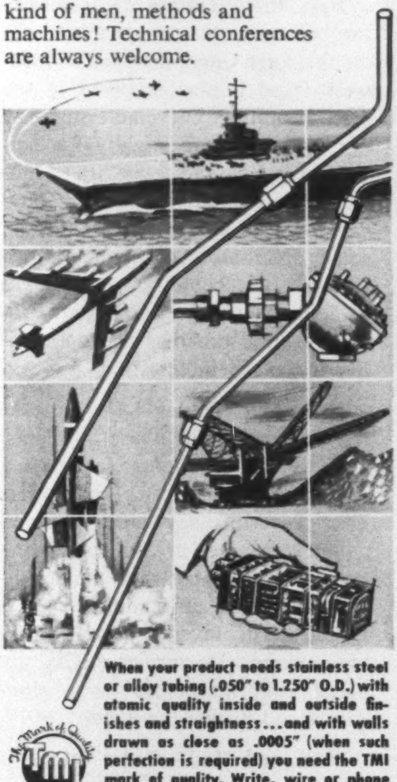

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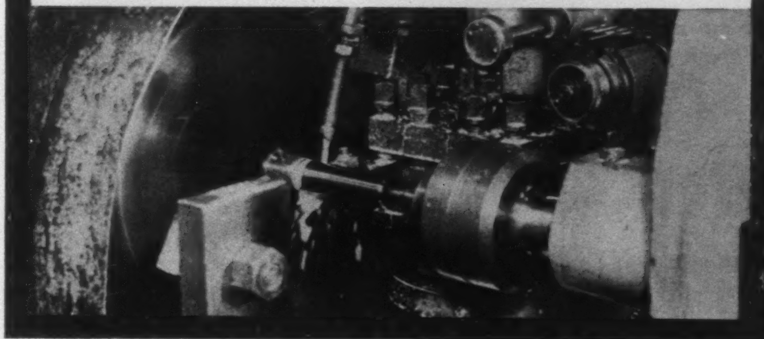

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Auto Sheet Cutbacks Discourage Mills

Steel sales to automakers have sustained some mills in recent months. But auto sheet setbacks are hurting now.

One possible encouraging sign: Orders for specialty steels are more active.

▪ Mills are watching two market developments this week: Setbacks in auto sheet orders and a possible pickup for specialty products.

The setbacks by the automakers are another discouraging sign in an already weak market. More life in the specialty market is encouraging.

Right now, sales of specialties are about the only improved part of the market. Orders for non-automotive stainless have been picking up slightly. Tool steel orders are not as active, but mills say signs of life are starting to appear.

Forerunner? — Specialties were one of the first steel products to decline. And normally, when the market turns up they lead the way back. Gains for these products might hint at a coming overall pickup for steel.

On the other hand, the setbacks in auto steel orders are causing gloom. Two of the largest auto companies cut back tonnage from October to November. A third automaker is expected to push back November steel into December. One source estimates as much as 15 to 20 pct of auto steel tonnage has been deferred from November to December.

The automakers have been the chief buying force in the sheet market for months. Other large users—including appliance makers and stampers—are doing very little buying. Cutbacks in auto steel buying will hurt the market still more.

Sheet and Strip — Absence of strong auto industry support is weakening the sheet market still further. In most major markets the automakers are cutting back or deferring tonnage. **Pittsburgh** mills say November sheet tonnage will be about the same as October's. Galvanized sheet is doing a little better than other flat-rolled products. But even so, users order from day to day with mills giving immediate delivery from stock.

East Coast sheet buyers are pitting mills against one another for fast delivery. Most mill orders are filled by processing coils already in stock. In some cases, mills roll all the way through to coils for regular customers and wait for them to order.

Auto sheet setbacks have hurt **Cleveland** area mills. Sheet mills there are operating at about 50 pct of capacity. Deliveries are requested "early in the week" or "late in the week." At **Detroit,** auto steel orders for October will be below September's. Right now November should be about equal with October. And December could fall below November.

Stretchouts from auto buyers have also hit **Chicago** mills. In addition, there are continuing declines in orders for galvanized, tinplate, and electrical sheet.

PURCHASING AGENT'S CHECKLIST

Domestic and export sales of construction equipment are down. But manufacturers are beefing up foreign plants. P. 43

Cold-drawn electricweld tubing is moving into markets held by seamless products. P. 47

Wave of cancellations hit machine tool sales in September. But buyers may be revising plans after Machine Tool Show. P. 48

Plates and Shapes—Some construction buying has improved orders for structurals on the **East Coast** and at **Pittsburgh.** But orders are still being shipped in two weeks or less. The buying flurry also appears to be dying out. There's little ordering of structurals by freight carbuilders. Plate demand for linepipe is very weak. At **Chicago,** plate, which had been moving well, has slowed down. Cutbacks by linepipe makers and carbuilders are apparently responsible.

Bar—Price cutting by reinforcing bar converters is reported both on the **East Coast** and in the **Midwest.** Rod is also involved in the price trimming. **Cleveland** mills say bar orders are up slightly for November. But the gain isn't substantial. Auto forgers are still buying hand-to-mouth. At **Chicago,** some distributors are laying down foreign bar before Great Lakes shipping halts for the winter. Producers there are making rapid deliveries, often in less than a week.

Pipe and Tubing—The market remains static for these products. Jobbers are not doing any buying against a possible steel price rise Dec. 1. Mills say orders for oil country seamless are still below the petroleum drilling rate. In addition, any order gains could be offset by an end to inventory building by pipemakers. Downriver stocks are being built up before barge shipments end during the winter.

Wire and Rod—Order intake is still very slow and highly competitive. Mills are operating at about 50 pct of capacity. Construction sales are coming to a seasonal close.

COMPARISON OF PRICES

(Effective Nov. 1, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Nov. 1 1960	Oct. 25 1960	Oct. 4 1960	Nov. 3 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196c

	Nov. 1 1960	Oct. 25 1960	Oct. 4 1960	Nov. 3 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.11*	$70.11	$70.57	$70.57
Foundry, South Cin'ti.	71.92	71.92**	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	69.61	69.61	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡.	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.32	$66.32	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$26.50*	$28.50	$29.50	$47.50
No. 1 steel, Phila. area	32.50*	33.50	33.50	46.50
No. 1 steel, Chicago	25.50*	26.50	26.50	44.50
No. 1 bundles, Detroit	21.50*	23.50	26.50	41.50
Low phos., Youngstown	27.50	27.50	33.00	49.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	55.50
No. 1 mach'y cast, Phila.	48.50	48.50	49.50	53.50
No. 1 mach'y cast, Chicago	41.50	41.50	41.50	64.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$28.17*	$29.50	$29.83	$46.17
No. 2 bundles	18.50*	19.83	20.17	31.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	33.00	30-31.50
Copper, Lake, Conn.	30.00	30.00	33.00	31.50
Tin, Straits, N. Y.	104.00†	103.125	102.075	101.25
Zinc, East St. Louis	13.00	13.00	13.00	12.50
Lead, St. Louis	11.80	11.80	11.80	12.80
Aluminum, ingot	26.00	26.00	26.00	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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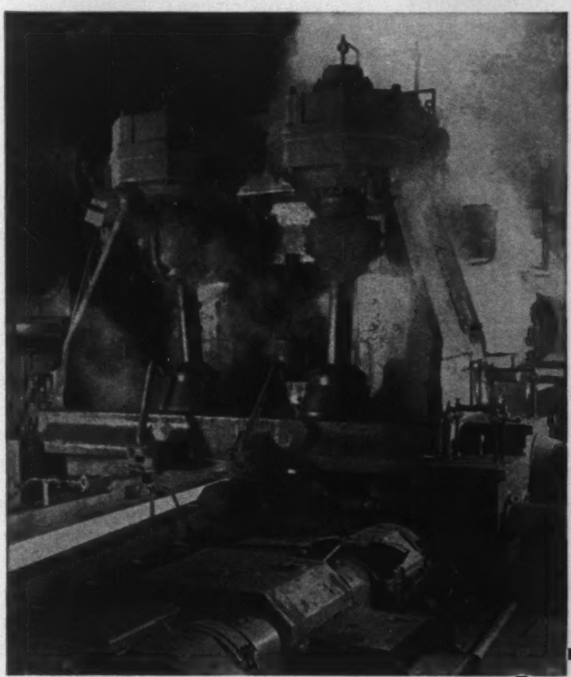
* Appears in the Oct. 27 - Nov. 10 issues.



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Pittsburgh Leads Market Drop

The overall scrap market is weaker again this week with prices continuing to drop.

Pittsburgh prices took a big dip as industrial grades fell off.

- Scrap prices continue to drop and the market looks even weaker. This week, the bottom fell out in Pittsburgh with industrial grades leading a general drop of $2 and $3.

Chicago, where the market showed some gains last week, slipped again. And, easing exports have weakened the New York market.

The IRON AGE composite price for No. 1 heavy melting is down to $28.17 from $29.50. One year ago, this composite price was $46.17. The IRON AGE composite price for No. 2 bundles is also off, dropping to $18.50 from $19.83.

Two of the four areas which last week had hopes of an upswing soon, are now braced for further price drops. In Detroit, dealer morale is at a new low and no one is predicting any kind of pickup before 1961. In St. Louis, one mill is buying and holding prices steady, but scrapmen believe drops will come when the mill stops buying.

Pittsburgh — The market broke sharply downward this week with industrial grades leading a general drop of $2 or $3. Early automotive scrap offerings were down more than $2 and the main local list went for about $4 under last month. Later in the week, a major consumer bought No. 2 bundles for $21. This price is $5 under the last purchase by the same consumer and $3 under the most recent buying level. Finally, a mill on the fringe of the district bought No. 1 heavy melting at a price to the dealer of $27. This is down $2 from the comparable figure last month. Prices have dropped below levels that had been regarded as absolute bottom, and no one is sure the slide has been checked.

Chicago—Prices slipped on factory bundle sales last week, wiping out a few minor gains of the previous week. Despite this apparent weakening, scrap continues to tighten at the dealer level, And, though mills are offering low prices, railroad lists continue relatively strong. Cast appears firm, but no price gains are reported.

Philadelphia—Domestic activity is almost non-existent, but there is enough export to sustain most scrapmen. A feeling persists, however, that exports may ease considerably during November bringing end-of-the-year activity to a standstill. All openhearth grades are off $1 on a sale of No. 2 heavy melting and appraisal of the weak market.

New York—"We've got enough scrap right now to fill our export orders for the rest of the year," reports a major dealer. This, combined with the continued lack of domestic interest is weakening the market. However, dealers insist that many items are priced near the break-even point now, so further drops will be selective.

Detroit—The sharp drop in November industrial list prices dragged dealer morale to a new low. A surprise buy of industrial bundles for export may have saved the market from falling even lower. No one predicts any kind of upswing before 1961.

Cleveland—Auto lists are off $1 from previous quotations, or about $4.50 less than one month ago. This is almost a $9 drop in two months. The bulk will probably go to area mills thus overhanging the market and making it even tougher for dealers. The number of bidders is down, indicating a decrease in buying power. Foundry scrap continues slow with the heaviest buyers still working down inventory.

Cincinnati—The market is off 50 cents on a purchase by an area mill. But large consumers are still not interested. New lower prices are beginning to look tempting to mill buyers and some small tonnage is moving on this basis.

St. Louis—Increased buying by a local mill helped sustain current price levels. However, this buying has attracted scrap from a wider area and some scrapmen believe further drops will appear when the mill stops buying.

Birmingham—An Alabama mill bought No. 1 bundles, but otherwise there was no scrap movement this week. A lack of supply is making it difficult for some dealers to deliver. Electric furnaces and pipe manufacturers are out of the market.

Buffalo — There were no new sales this weak and the market remains quiet. Prices are unchanged.

Boston — The market is way down. Some sales were made at reduced prices.

West Coast—Some dealers are so pessimistic they can't see any upturn before next spring. Prices all along the West Coast are soft. Some scrapmen say they wouldn't be surprised by lower prices.

Houston—The domestic market is quiet, but there is a pickup in exports.

SCRAP PRICES *(Effective Nov. 1, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	28.00 to 29.00
No. 1 factory bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	26.00 to 27.00
Machine shop turn.	11.00 to 12.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Low phos. punch'gs plate	32.00 to 33.00
Heavy turnings	23.00 to 24.00
No. 1 RR hvy. melting	32.00 to 33.00
Scrap rails, random lgth.	41.00 to 42.00
Rails 2 ft. and under	46.00 to 47.00
RR specialties	36.00 to 37.00
No. 1 machinery cast	45.00 to 46.00
Cupola Cast	35.00 to 36.00
Heavy breakable cast	33.00 to 34.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	85.00 to 90.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy melting	23.00 to 24.00
No. 1 dealer bundles	26.00 to 27.00
No. 1 factory bundles	29.00 to 30.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	25.00 to 26.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. forge crops	37.00 to 38.00
Low phos. punch'gs plate, ¼ in. and heavier	33.00 to 34.00
Low phos. 2 ft. and under	31.00 to 32.00
No. 1 RR hvy. melting	30.00 to 31.00
Scrap, rails, random lgth.	37.00 to 38.00
Rerolling rails	48.00 to 49.00
Rails 2 ft. and under	41.00 to 42.00
Angles and splice bars	38.00 to 39.00
RR steel car axles	46.00 to 47.00
RR couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	41.00 to 42.00
Cupola cast.	36.00 to 37.00
Cast iron wheel	27.00 to 28.00
Malleable	40.00 to 41.00
Stove plate	30.00 to 31.00
Steel car wheels	35.00 to 36.00
Stainless	
18-8 bundles and solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	80.00 to 85.00
430 turnings	40.00 to 45.00

Philadelphia Area

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	12.00 to 13.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Clean cast. chem. borings	23.00 to 24.00
Low phos. 5 ft and under	35.00 to 36.00
Low phos. 2 ft punch'gs	37.00 to 38.00
Elec. furnace bundles	34.00 to 35.00
Heavy turnings	25.00 to 26.00
RR specialties	38.00 to 39.00
Rails, 18 in. and under	48.00 to 50.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	36.00 to 37.00
Cast iron car wheels	39.00 to 40.00
Malleable	45.00 to 46.00
No. 1 machinery cast.	48.00 to 49.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$22.50 to $23.50
No. 2 hvy. melting	19.50 to 20.50
No. 1 dealer bundles	22.50 to 23.50
No. 2 bundles	15.00 to 16.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Low phos. 18 in. and under	31.00 to 32.00
Rails, random length	37.00 to 38.00
Rails, 18 in. and under	45.00 to 46.00
No. 1 cupola cast	35.00 to 36.00
Hvy. breakable cast.	28.00 to 29.00
Drop broken cast.	45.00 to 46.00

Youngstown

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	21.50 to 22.50
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	18.50 to 19.50
Machine shop turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Low phos. plate	27.00 to 28.00

Cleveland

No. 1 hvy. melting	$23.50 to $24.50
No. 2 hvy. melting	17.50 to 18.50
No. 1 dealer bundles	23.50 to 24.50
No. 1 factory bundles	27.00 to 28.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	23.50 to 24.50
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Cut structural & plates, 2 ft. & under	30.00 to 31.00
Low phos. punch'gs plate	24.50 to 25.50
Drop forge flashings	23.50 to 24.50
Foundry steel, 2 ft. & under	29.00 to 30.00
No. 1 RR hvy. melting	28.00 to 29.00
Rails 2 ft. and under	45.00 to 46.00
Rails 18 in. and under	46.00 to 47.00
Steel axle turnings	20.00 to 21.00
Railroad cast.	43.00 to 44.00
No. 1 machinery cast.	43.00 to 44.00
Stove plate	36.00 to 37.00
Malleable	43.00 to 44.00
Stainless	
18-8 bundles	175.00 to 180.00
18-8 turnings	70.00 to 75.00
430 bundles	75.00 to 80.00

Buffalo

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 busheling	25.00 to 26.00
No. 1 dealer bundles	25.00 to 26.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	12.00 to 13.00
Low phos. plate	33.00 to 34.00
Structurals and plate, 2 ft. and under	35.00 to 36.00
Scrap rails, random lgth.	34.00 to 35.00
Rails 2 ft. and under	44.00 to 45.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	26.00 to 27.00
Foundry steel, 2 ft.	28.00 to 29.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	7.00 to 8.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	17.00 to 18.00
No. 1 RR hvy. melting	30.00 to 31.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	37.00 to 38.00
RR specialties	35.00 to 36.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	46.50 to 47.50
Unstripped motor blocks	35.00 to 36.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	31.00 to 32.00
Elec. furnace, 3 ft. & under	33.00 to 34.00
Bar crops and plate	37.00 to 38.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR hvy. melting	32.00 to 33.00
Scrap rail, random lgth.	36.00 to 37.00
Rails, 18 in. and under	43.00 to 44.00
Angles and splice bars	37.00 to 38.00
No. 1 cupola cast.	46.00 to 47.00
Stove plate	46.00 to 47.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	19.00 to 20.00
No. 2 dealer bundles	14.00 to 15.00
Machine shop turnings	5.00 to 6.00
Mixed bor. and turn.	7.00 to 8.00
Shoveling turnings	9.00 to 10.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 dealer bundles	21.00 to 22.00
No. 2 bundles	14.00 to 15.00
No. 1 busheling	18.00 to 19.00
Drop forge flashings	18.00 to 19.00
Machine shop turn.	6.00 to 7.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	9.00 to 10.00
Heavy breakable cast.	23.00 to 24.00
Mixed cupola cast.	30.00 to 31.00
Automotive cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	155.00 to 160.00
18-8 turnings	45.00 to 50.00
430 bundles and solids	50.00 to 55.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$22.00 to $23.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 dealer bundles	22.00 to 23.00
No. 2 bundles	12.00 to 13.00
No. 1 busheling	22.00 to 23.00
Machine shop turn.	3.50 to 4.50
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	11.00 to 12.00
No. 1 machinery cast.	37.00 to 38.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	25.50 to 26.50

San Francisco

No. 1 hvy. melting	....	$32.00
No. 2 hvy. melting	....	29.00
No. 1 dealer bundles	$27.00 to	28.00
No. 2 bundles	....	18.00
Machine shop turn.	....	14.00
Cast iron borings	....	45.00
No. 1 cupola cast.	....	45.00

Los Angeles

No. 1 hvy. melting	....	$30.00
No. 2 hvy. melting	....	27.00
No. 1 dealer bundles	....	25.00
No. 2 bundles	....	17.00
Machine shop turn.	....	12.00
Shoveling turnings	....	13.00
Cast iron borings	....	13.00
Elec. furnace 1 ft. and under (foundry)	....	41.00
No. 1 cupola cast.	$38.00 to	39.00

Seattle

No. 1 hvy. melting	....	$33.00
No. 2 hvy. melting	....	31.00
No. 2 bundles	....	21.00
No. 1 cupola cast	....	36.00
Mixed yard cast.	....	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	....	$25.80
No. 2 hvy. melting cut 3 ft. and under	....	22.50
No. 1 dealer bundles	....	25.80
No. 2 bundles	....	19.00
Mixed steel scrap	....	16.00
Bush., new fact, prep'd	....	25.50
Bush., new fact, unprep'd	.....	20.45
Machine shop turn.	....	10.00
Short steel turn.	....	12.00
Mixed bor. and turn.	....	12.00
Cast scrap	....	33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	....	$32.00
No. 2 hvy. melting	....	29.00
No. 2 bundles	....	20.50
Machine shop turn.	....	12.00
Shoveling turnings	....	14.00
Cut structural plate 2 ft. & under	$40.00 to	41.00
Unstripped motor blocks	26.00 to	27.00
Cupola cast.	33.00 to	34.00
Heavy breakable cast.	25.00 to	26.00

Is Aluminum Import Drop Temporary?

Industry executives warn drop in aluminum imports may be temporary, ending when European consumption starts to lag.

Three U. S. and one Canadian companies join together to finance new rolling mill.

- Imports of aluminum this year are running about 20 pct below 1959.

Nevertheless, Clayton Grover, president, Whitehead Metals Inc., New York, told the current meeting of the National Assn. of Aluminum Distributors that "imports remain a serious and growing problem."

Mr. Grover was reporting for the Import Committee of the aluminum distributors organization.

Why is this group still worried despite the drop in imports? The drop "is undoubtedly due to high demand in Western Europe, rather than a change in the competitive situation," reported Mr. Grover.

Confirmation From Abroad—This is confirmed by Nathanael Davis, president of Canada's Aluminium Ltd. On his return recently from a three-week tour in Europe, he said: "The general tone of business is healthy. While North American consumption of aluminum has been lagging somewhat this year. indications are that consumption in the rest of the Free World has increased by about 15 pct."

But the implication of the statement by Whitehead's Mr. Grover is clear: If the boom in Europe levels off, the volume of imports would probably pickup to former proportions.

Suggested Remedies — What is the answer?

Mr. Grover's committee recommends increasing "world consumption of aluminum which is now 27 lb per capita in the U. S., 7 lb in other industrial countries, and one-third lb in the rest of the world."

Mr. Grover also advised the aluminum warehousemen to close ranks with U. S. producers on the import problem. He reported that at the last meeting of the U. S. aluminum industry, called by the Dept. of Commerce, he, as spokesman for aluminum distributors "supported the position of the producers."

Mr. Grover suggested, along with producers, that "representatives from the aluminum industry be invited as advisors to the GATT (General Agreement on Trade and Tariffs) delegations."

Committee Projects—Among the leading projects of the import committee, reported by the Whitehead Metals president, is assembling data on world wide shipments of common alloy sheet, circles, and screw machine rod. These are the items on which domestic industry is being hit hardest by imports. The group is trying to pinpoint the situation to be ready with suggestions for remedial action.

Mr. Grover wound up his report by suggesting that "Individually we should continue to point out to our friends, political representatives, employees and customers that, when aluminum is imported, we are hurt, our workers are hurt, and jobs are being exported."

Joint Venture—In a move to expand markets in the U. S. Aluminium has joined with three U. S. companies to build a new aluminum hot-rolling mill to "supply aluminum reroll stock for their sheet mills." It will have a capacity of about 100,000 tons of reroll stock annually.

The move also points up the trend toward joint ventures as a means of assembling expansion capital. Other partners in the new facility are Bridgeport Brass Co., Cerro de Pasco Corp., and Scovill Mfg. Co.

Large Investment—Total investment will be about $30 million. A new corporation will be formed. It will be operated by Aluminium. The Canadian company will supply aluminum ingots for the mill, but it may also mark the first move by the company to enter the U. S. market with aluminum products. Currently, Aluminium only sells primary aluminum in the U. S.

Location of the new plant hasn't been announced. However, the forming group agrees it will be in the northeastern U. S.

Tin prices for the week: Oct. 26—104.00; Oct. 27—104.00; Oct. 28 — 104.00; Oct. 31 — 104.00; Nov. 1—104.00*.

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	30.00	33.00	10/11/60
Copper (CS)	30.00	31.00	10/13/60
Copper (L)	30.00	33.00	10/13/60
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium Ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 125.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand, Grade	......	67.9	69.0	77.9	103.1
AZ31B Spec.	......	93.3	96.9	108.7	171.3
Tread Plate	......	70.6	71.7	......	......
Tooling Plate	73.0	......	......	......	......

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)	37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting)	40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.13	....	52.36	56.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	51.75	52.04	51.69	55.81
Brass, Red	52.62	52.91	52.56	56.68
Brass, Naval	54.08	60.39	47.89	58.24
Muntz Metal	52.14	....	47.45	....
Comm. Bz.	54.03	54.32	53.97	57.84
Mang. Bz.	57.82	....	51.42	....
Phos. Bz. 5%	75.70	75.70	76.20	77.63

Free Cutting Brass Rod 34.88

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.	29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be	$65.00
Beryllium copper, per lb conta'd Be	$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading	$70.00
Bismuth, ton lots	$ 2.25
Cadmium, del'd	$ 1.50
Calcium, 99.9% small lots	$ 4.55
Chromium, 99.8% metallic base	$ 1.31
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined	$29.95 to $36.95
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$75 to $85
Lithium, 98%	$9.00 to $12.00
Magnesium sticks, 10,000 lb.	57.00
Mercury, dollars per 76-lb flask f.o.b. New York	$208 to $210
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel	69.60
Palladium, dollars per troy oz.	$24 to $26
Platinum, dollars per troy oz.	$82 to $85
Rhodium	$137 to $140
Silver ingots (¢ per troy oz.)	91.375
Thorium, per kg.	$43.00
Vanadium	$ 3.65
Zirconium sponge	$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115	28.25
No. 120	27.25
No. 123	26.25
80-10-10 ingot	
No. 305	32.75
No. 315	30.50
88-10-2 ingot	
No. 210	40.50
No. 215	37.25
No. 245	32.50
Yellow ingot	
No. 405	23.50
Manganese bronze	
No. 421	27.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	24.25-24.50
0.60 copper max.	24.00-24.25
Piston alloys (No. 132 type)	26.00-27.00
No. 12 alum. (No. 2 grade)	22.75-23.25
108 alloy	23.25-23.75
195 alloy	25.75-26.75
13 alloy (0.60 copper max.)	24.00-24.25
AXS-679 (1 pct zinc)	23.00-24.00

(Effective Nov. 1, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½%	23.75-24.75
Grade 2—92-95%	22.50-23.50
Grade 3—90-92%	21.50-22.50
Grade 4—85-90%	21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	20⅜	18⅝
Red brass	23¼	22½
Comm. bronze	24	23¼
Mang. bronze	19⅛	18⅜
Free cutting rod ends.	19⅝	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24¼
No. 2 copper wire	22½
Light copper	20¼
*Refining brass	20½
Copper bearing material	19

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	23¾
No. 2 copper wire	22¼
Light copper	20
No. 1 composition	19½
No. 1 comp. turnings	19
Hvy. yellow brass solids	15
Brass pipe	14
Radiators	16

Aluminum

Mixed old cast.	13 —13½
Mixed new clips	14½—15
Mixed turnings, dry	13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	21½—22
No. 2 copper wire	19½—20
Light copper	17½—18
Auto radiators (unsweated)	12½—12¾
No. 1 composition	16½—17
No. 1 composition turnings	15¼—15¾
Cocks and faucets	12¾—13¼
Clean heavy yellow brass	11¾—12¼
Brass pipe	13¼—13¾
New soft brass clippings	13½—13¾
No. 1 brass rod turnings	12½—12¾

Aluminum

Alum. pistons and struts	6½— 7
Aluminum crankcase	8½— 9
1100 (2s) aluminum clippings	10 —10½
Old sheet and utensils	8½— 9
Borings and turnings	4½— 5
Industrial castings	9 — 9½
2020 (24s) clippings	10 —10½

Zinc

New zinc clippings	7 — 7¼
Old zinc	4 — 4½
Zinc routings	3 — 3¼
Old die cast scrap	2 — 2¼

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	23-23.50
Clean Monel turnings	16.50-17
Old sheet Monel	22-23
Nickel silver clippings, mixed.	18
Nickel silver turnings, mixed.	15

Lead

Soft scrap lead	8 — 8¼
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	79 —80
No. 1 pewter	59 —60
Auto babbitt	43 —44
Mixed common babbitt	10¼—10¾
Solder joints	14½—15
Siphon tops	41
Small foundry type	9¾—10¼
Monotype	9¾—10¼
Lino. and stereotype	8¾— 9
Electrotype	7½— 7¾
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2¼— 2¾
Electro dross	2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M10*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y4*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective Nov. 1, 1960)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective Nov. 1, 1960)

†† 7.425 at Sharon-Niles is 7.225.

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	**Bethlehem, Pa.**				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*		7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	**Alton, Ill.**	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	**Emeryville, Fontana, Cal.**	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	**Atlanta, Ga.**	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher.

(Effective Nov. 1, 1960)

* Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angel Nail & Chaplet Co., Cleveland
A7	Armco Steel Corp., Middletown, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme-Newport Steel Co., Newport, Ky.
A10	Alaska Steel Mills, Inc., Seattle, Wash.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Steel Co., Pacific Coast Div.
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7	A. M. Byers, Pittsburgh
B8	Braeburn Alloy Steel Corp., Braeburn, Pa.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia Geneva Steel Div., San Francisco
C8	Columbia Steel & Shafting Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperweld Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shafting Co., Readville, Mass.
C15	G. O. Carlson, Inc., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C18	Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
D1	Detroit Steel Corp., Detroit
D2	Driver, Wilbur B., Co., Newark, N. J.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherproof Nail Co., Evanston, Ill.
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire-Reeves Steel Corp., Mansfield, O.
E3	Enamel Products & Plating Co., McKeesport, Pa.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimons Steel Corp., Youngstown
F3	Follansbee Steel Corp., Follansbee, W. Va.
G2	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Greer Steel Co., Dover, O.
G5	Green River Steel Corp., Owenboro, Ky.
H1	Hanna Furnace Corp., Detroit
I2	Ingersoll Steel Div., New Castle, Ind.
I3	Inland Steel Co., Chicago, Ill.
I4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jessop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Calif.
K2	Keystone Steel & Wire Co., Peoria
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O.
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mfg. Co., Sharon, Pa.
M4	Mid States Steel & Wire Co., Crawfordsville, Ind.
M7	Milton Steel Products Div., Milton, Pa.
M8	Mill Strip Products Co., Evanston, Ill.
M9	Moltrup Steel Products Co., Beaver Falls, Pa.
M10	Mill Strip Products Co., of Pa., New Castle, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N6	Northwest Steel Rolling Mills, Seattle
N7	Newman Crosby Steel Co., Pawtucket, R. I.
N8	Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9	Nelson Steel & Wire Co.
O1	Oliver Iron & Steel Co., Pittsburgh
O2	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monessen, Pa.
P2	Phoenix Steel Corp., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit
P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden, N. J.
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
P15	Philadelphia Steel and Wire Corp.
R1	Reeves Steel & Mfg. Div., Dover, O.
R2	Reliance Div., Eaton Mfg. Co., Massillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebling Sons Co., John A., Trenton, N. J.
R5	Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6	Rodney Metals, Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Div. of Copperweld Steel Co.
S10	Seneca Steel Service, Buffalo
S11	Southern Electric Steel Co., Birmingham
S12	Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13	Seymour Mfg. Co., Seymour, Conn.
S14	Screw and Bolt Corp. of America, Pittsburgh, Pa.
T1	Tonawanda Iron Div., N. Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Strip Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O.
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3	Ulbrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Wallingford Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheatland Tube Co., Wheatland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago.
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities		Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	City Delivery‡ Charge	Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta	....	9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	....	....	....	....
Baltimore**	$.10	7.87	9.71	10.16	10.78	8.44	9.13	8.65	11.90	17.48	16.48	21.58	20.83
Birmingham**	....	8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	16.76	....	....
Boston**	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.80	9.95	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.72	10.35	10.30	10.89	8.56	9.06	8.70	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	8.89	10.41	10.35	11.21	8.94	9.62	9.02	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.72[1]	10.03	11.39	11.01	8.80	9.45	8.81	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	....	....	....	20.84
Detroit**	.15	8.98	10.61	10.65	11.26	8.93	9.62	9.01	11.16	17.38	16.38	21.48	20.73
Houston**	....	9.22	9.65	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**	....	9.59[1]	11.29	12.20	11.29	9.70	10.45	9.55	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.13	10.20	....	11.39	8.81	9.16	8.97	12.89	....	....	....	....
Milwaukee**	.15	8.86	10.49	10.44	11.03	8.70	9.28	8.84	11.04	17.24	16.24	21.24	20.59
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	....	....	8.90	8.65	9.20	8.90	10.70	....	....	....	....
Philadelphia**	.10	8.45	9.70	11.50	10.95	8.80	9.05	8.85	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	8.72	10.03	11.28	10.99	8.56	9.06	8.70	11.40	17.10	16.10	21.20	20.45
Portland**	....	9.45	11.30	12.35	11.45	9.60	10.80	9.45	16.65	18.60	17.80	22.70	22.20
San Francisco**	.10	10.27	11.79[2]	11.50	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**	....	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.92	10.75	10.68	11.09	8.77	9.29	8.92	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	8.99	9.84	10.99	11.16	8.83	9.33	8.97	11.64	....	16.69	....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Nov. 1, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	......	......
Birmingham *W9*	62.00	62.50*	66.50	......	......
Birmingham *U4*	62.00	62.50*	66.50	......	......
Buffalo *R3*	66.00	66.50	67.00	67.50	......
Buffalo *H1*	66.00	66.50	6[illegible].00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	......
Chester *P2*	68.00	68.50	69.00	......	......
Chicago *I4*	66.00	66.50	66.50	67.00	......
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	......
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	......	......	......
Geneva, Utah *C7*	66.00	66.50	......	......	......
Granite City *G2*	67.90	68.40	68.90	......	......
Hubbard *Y1*	......	......	66.50	......	......
Ironton, Utah *C7*	66.00	66.50	......	......	......
Lyles, Tenn. *T3*	......	......	......	......	73.00
Midland *C11*	66.00	......	......	......	......
Minnequa *C6*	68.00	68.50	69.00	......	......
Monessen *P6*	66.00	......	......	......	......
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	......	66.50	67.00	67.50	......
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	......	66.50	67.00	......
So. Chicago *R3*	66.00	66.50	66.50	67.00	......
So. Chicago *W8*	66.00	......	66.50	67.00	......
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66-00	66.50	66.50	67.00	......
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	......	......	66.50	......	......

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Discount Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	29.50	33.25	29.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa, *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Discount Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium..					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Nov. 1, 1960)

MERCHANT WIRE PRODUCTS

	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
F.o.b. Mill	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	......	......	...	...	......	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	......	......	...	...	......	9.00	9.55
Chicago *W7*	173	......	...	...	......	9.00	9.55†
Cleveland *A6*	......	......	...	...	......	......	......
Cleveland *A5*	......	......	...	...	......	9.00	......
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	......	...	...	......	......	......
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	......	......	...	...	......	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	......	......	...	...	......	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	......	......	...	236	......	9.95	10.50
SparrowsPt. *B3***	175	......	...	215	198	9.10	9.775
Struthers, O. *Y1**	......	......	...	...	......	8.65	9.20
Worcester *A5*	179	......	...	...	......	9.30	9.85
Williamsport *S5*	......	......	...	...	......	......	......

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	......	......	......	......	......	......	......	......
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	......	......	......	......	......	......	......	......
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50	......	......	......	......	......	......	......	......
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	......	......	......	......	......	......	......	......
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	......	......	......	......	......	......	......	......
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	......	......	......	......	......	......	......	......
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	......	......	......	......	......	......	......	......
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	......	......	......	......	......	......	......	......
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50	......	......	......	......	......	......	......	......
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	......	......	......	......	......	......	......	......
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	......	......	......	......	......	......	......	......
Fontana *K1*	+6.25	......	+2.25	......	0.75	......	1.25	......	1.75	......	2.25	......	2.75	......	......	......	......	......	......	......	......	......
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	......	......	......	......	......	......	......	......
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	5.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50	......	......	......	......	......	......	......	......
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

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RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited, 5000 lb lots	39.50
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	20.50
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.40

Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 25.2 Cu min, 6000 to 12,000 lbs per cwt	$13.75
Nickel sulfate, 5000 to 23,000 lbs	29.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. Chicago, 200 lb drums	25.00
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders		
Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R.		11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots		25.75
Carbonyl Iron (200 lb lots)		88.00
Welding Grades		8.10
Cutting and Scarfing Grades		9.85
Hydrogen reduced, domestic		11.25
Copper Powders		
Molding Grades		
Electrolytic, domestic, f.o.b. shipping point.		15.00†
Atomized	43.3 to	61.3
Reduced		15.00†
Chemically Precipitated		44.5
Brass, 5000-lb lots	35.2 to	50.1
Bronze, 5000-lb lots	51.3 to	55.2
Chromium, electrolytic		5.00
Lead		7.50†
Manganese, electrolytic		$1.00
Molybdenum	$3.60 to	$4.35
Nickel		$1.15
Carbonyl Nickel, 20,000 lb lots		$1.01
Nickel-Silver, 5000 lb lots	58.8 to	66.9
Silicon		70.00
Solder		7.00†
Stainless Steel, 316		$1.07
Stainless steel 304		89.00
Tin		14.00†
Titanium, 99.25 + pct, per lb, f.o.b.		$11.25
Tungsten, carbide grades		$3.25
Zinc	21.0 to	34.2

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† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	**Grain Oriented**	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*)· Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, P2, A3, J2*)			Sheet (*I2*)
		10 pct	15 pct	20 pct	20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

(Effective Nov. 1, 1960)

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., **Ensley, Ala.**	$158.00
Childs, Hays	163.00
Chicago District	168.00
Western Utah	183.00
California	185.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O.	163.00-168.00
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union, Pa.	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Standard chemically bonded,	
Baltimore, Md.	$620.00
Gary, Ind.	658.50
Standard, Pascagoula, Miss.	647.50
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Baltimore	585.00

Magnesite Brick

Standard, Baltimore	$715.00
Chemically bonded, Baltimore	655.00
Chemically bonded, Pascagoula, Miss.	682.50

Grain Magnesite

St. ¾ to ½-in. grains

	Per net ton
Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b., Pascagoula, Miss.	80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

ELECTRODES

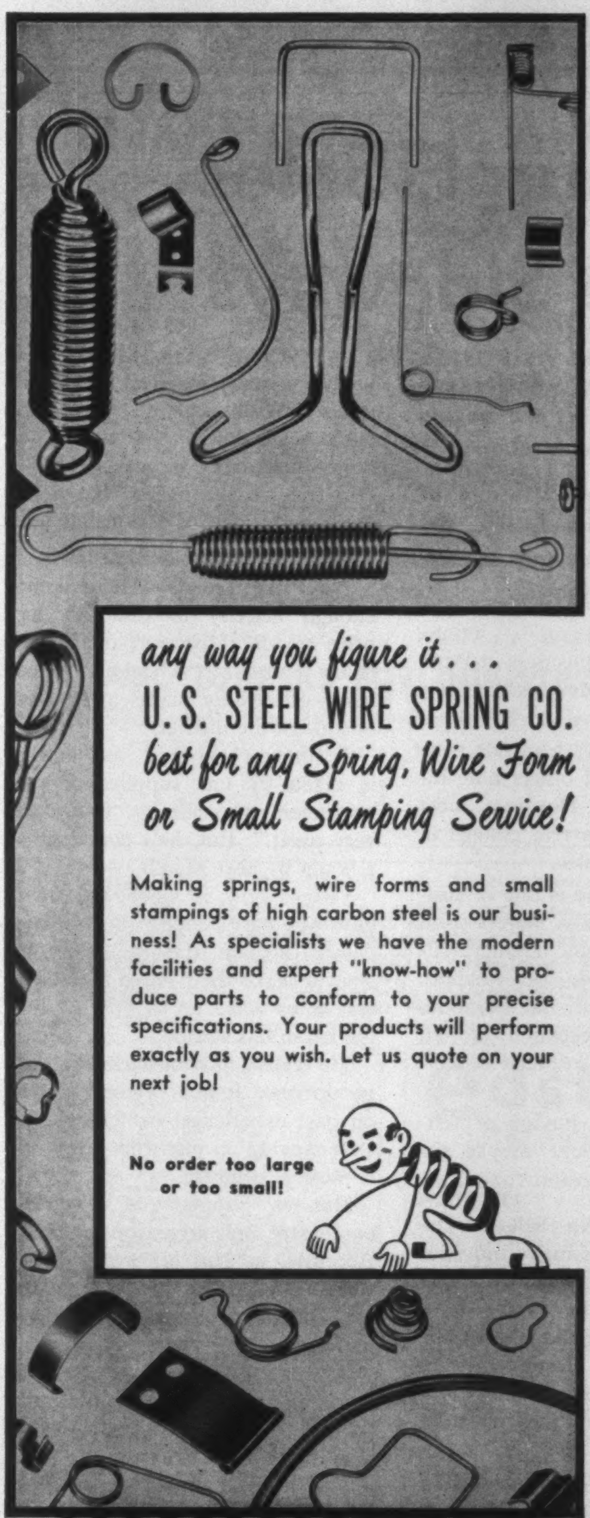
Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	....
	2½	12	54.23	63.57	....
	3	12	62.62	73.40	....
	3½	11	73.11	85.70	....
	4	10	97.08	113.80	....



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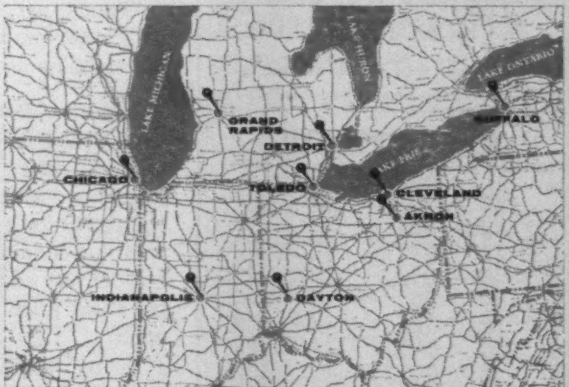
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1	2400	GE	450	300	2300/4600
1	2000	GE	514	600	2300/4600
2	1750/2100	GE	514	250/300	2300/4600
1	1750	GE	514	600	2300/4600
1	1500	GE	720	600	6600/13200
1	1000	GE	720	275	2300/4160
1	1000	GE	900	260	4000/6600
1	1000	GE	900	600	2300/4160
1	500	GE	900	125/250	440
1	500(New)	GE	1200	300	2300
1	500	GE	900	250	2300/4160
1	350	GE	900	125	440/2300/4160
1	300	GE	1200	275	2300/4160
1	300	GE	1200	250	440/2300
1	250	GE	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse	1200	550	2300
1	200	El.Mhy.	1200	250	2300/4600
1	150	GE	1200	275	2300
1	150	Whse.	1200	275	2300

D. C. MOTORS

Qu.	HP	Make	Type	Volts	RPM
1	3900(New)	GE	Enc. S.V.	475	320
1	3000(New)	Whse.	Enc. F.V.	525	600
2	2700	GE	Enc. S.V.	415	280
1	2250(New)	GE	Enc. S.V.	600	200/300
1	2200	GE	MCF	600	400/500
2	2000	GE	Enc. S.V.	350	230/350
2	1750	GE	Enc. S.V.	250	175/350
2	1500	Whse.	New	600	300/700
4	1500	Whse.	New	525	600
1	1300	GE	MCF	300	200/400
1	1200	GE	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D-8	600	600/900
2	900	GE	MCF	250	180/360
1	850	GE	MCF	250	85/170
1	750	GE	MCF	600	120/360
2	750	GE	MCF	600	450/900
2	645	SS		300	1000
4	600	Whse.		250	275/550
5	400	GM	D-8	250	300/900

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(1)—1325-KW Whse. 2-unit Set. Gen 600-V.D.C., with 2250-HP Syn. Motor 2300-V., 3 ph., 60 cy.
(1)—1520-KW 3-unit Set. (2) 760-KW Gen., 600-V.D.C., (1)—2250-HP Syn. Motor, 2300-V., 3 ph., 60 cy.
(1)—200-KW General Electric 3-unit Set, (2) 100-KW Gen. 250-V.D.C., with 300 HY Syn. Motor, 2300-V.D.C., 3 ph., 60 cy.
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Qu.	HP	Make	Volts	R.P.M.
1	3000	G.E.	600	90/180
2—N-*	3000	Whse.	600	600
2—N-*	2700	G.E.	415	280
1—N-*	2500	Whse.	700	108/162
1—N-*	2200	Whse.	600	92/132
2—N-*	2000	G.E.	350	230/350
2—N-*	1750	G.E.	600	200/300
1— *	1500	Al.Chal.	600	120/240
3—N-*	1500	Whse.	600	300/700
2—N-*	1400	G.E.	250	165/300
6—N-*	750	Whse.	250	300/700
1	750	Whse.	250	200/400
2— *	650	S.&S.	300	1000/1350
2	600	Al.Chal.	600	300/600
1	600	Whse.	250	110/220
2	300	Whse.	230	300/600
2	235	Whse.	230	325/975
1	150	Whse.	230	400/1200
1	125	Whse.	230	450/1050
3	125	Whse.	230	350/1125
1—N-*	100	Whse.	250	350/700

N—New and unused.

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THE CLEARING HOUSE

Pittsburgh Sales Move Sideways

Used machinery dealers in Pittsburgh say sales are moving sideways at a low level.

The general mood is one of hesitation and uncertainty. Demand is for lightweight models and auxiliary equipment.

■ Used machinery business in Pittsburgh is moving sideways at a low level.

Some dealers say there has been a slight pickup and others note inquiries are better. However, most area dealers see no real change in either interest or sales.

The general mood is one of hesitation and uncertainty. Buyers seem to be waiting for some definite indication, good or bad. The election, steel slump, international situation, and the general recession are all blamed for the widespread indecision.

"People are not buying or selling," says one dealer, "they're sitting tight."

Inquiries But No Sales—The same dealer reports many inquiries but few sales. He claims people only buy when they must have equipment for a specific job. In line with this condition, customers want fast delivery and don't usually quibble about price when they place an order.

In the general used machinery line, demand seems to center on lightweight models and auxiliary equipment. A dealer notes that the sheet-metal field is most active with demand running to small bending brakes and other light units.

There are also reports of interest in slitters and other steel mill auxiliaries. With demand for basic equipment down, the supply of heavy machinery is good. This is also true on the overall basis, but the general lack of action has held down the supply of late models.

No Price Trends—There is not enough activity to establish any price trends. However, one dealer hears reports of "ridiculous" prices being offered by plants and sellers outside of the district.

A unique view of the market is taken by one supplier of mill equipment who admits "things are very quiet." But, he's confident of a boom by next March.

"Right now is when the smart guys will start stepping in," he says, "when it's on the rock bottom. They'll make their move before the rest of us wake up to the fact that the boom has started."

He reasons that business can only go up once it hits bottom. Based on past experience, he feels it will start moving up just when everyone is most pessimistic.

But, a supplier of electrical equipment finds no reason for cheer. Recently, he had his worst month since 1954. The few orders that are secured involve extensive negotiations.

The latest report from the Machinery Dealers National Assn. shows dollar sales for September were down 23.3 pct from the same month last year, and down 16.3 pct from August. At the same time, the number of units in inventory is up 16.2 pct over September, 1959.

The sales figures cover only sales where the ultimate user of the equipment was invoiced and do not include sales to other dealers.

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Model 1404 Kearney & Trecker Simplex, m.d., production
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3-36" Cincinnati Duplex Hydromatic, m.d. in base
No. 4-36 Cincinnati Plain Hydromatic, m.d.
No. 5-48 Cincinnati Duplex Hydromatic, m.d.
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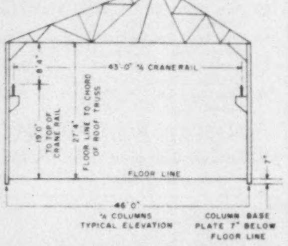

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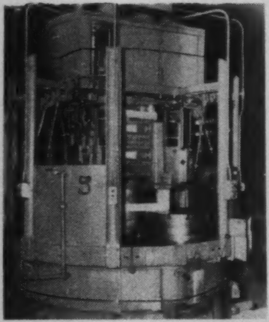

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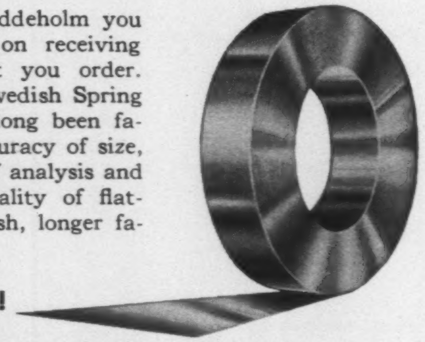

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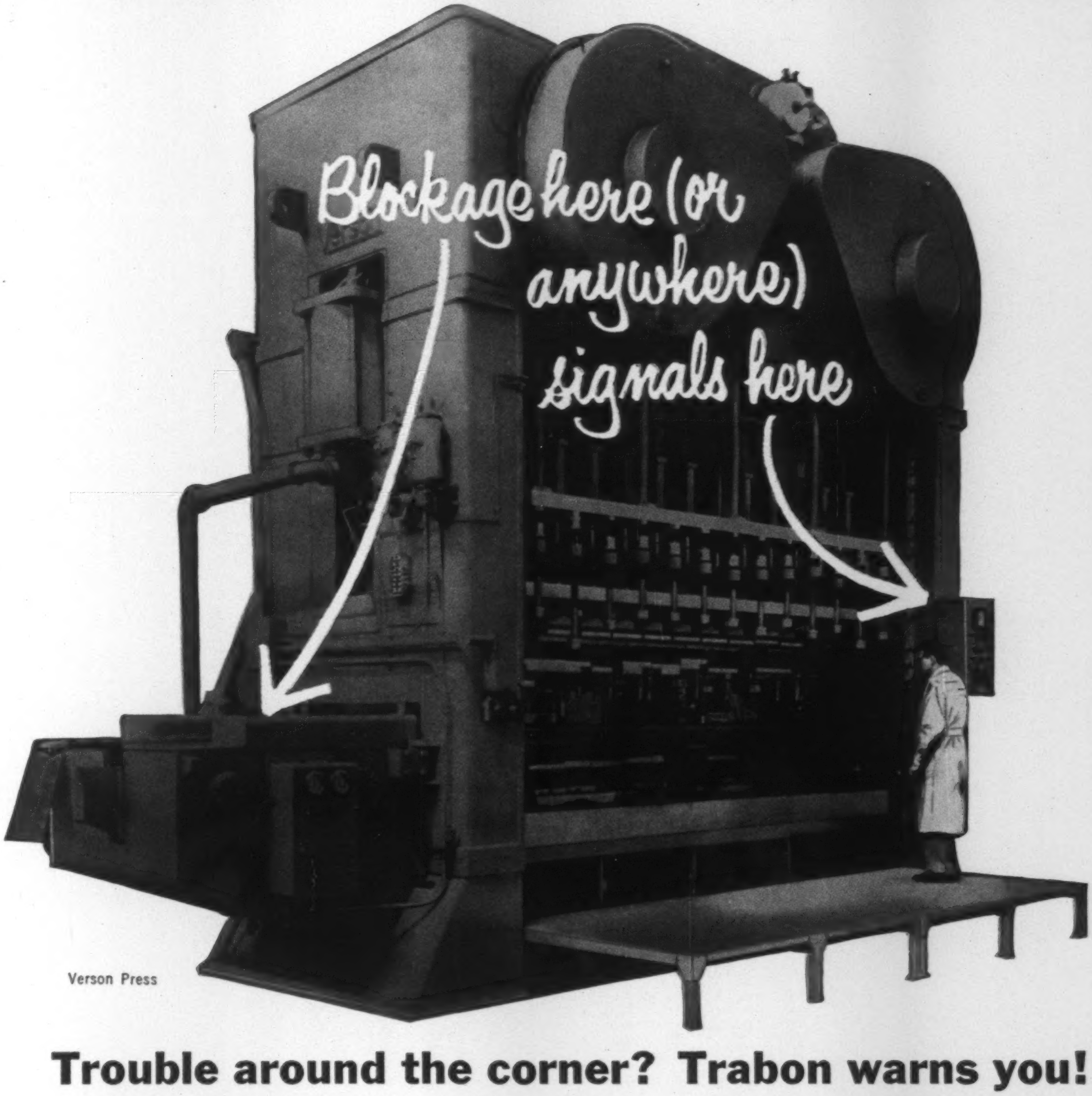

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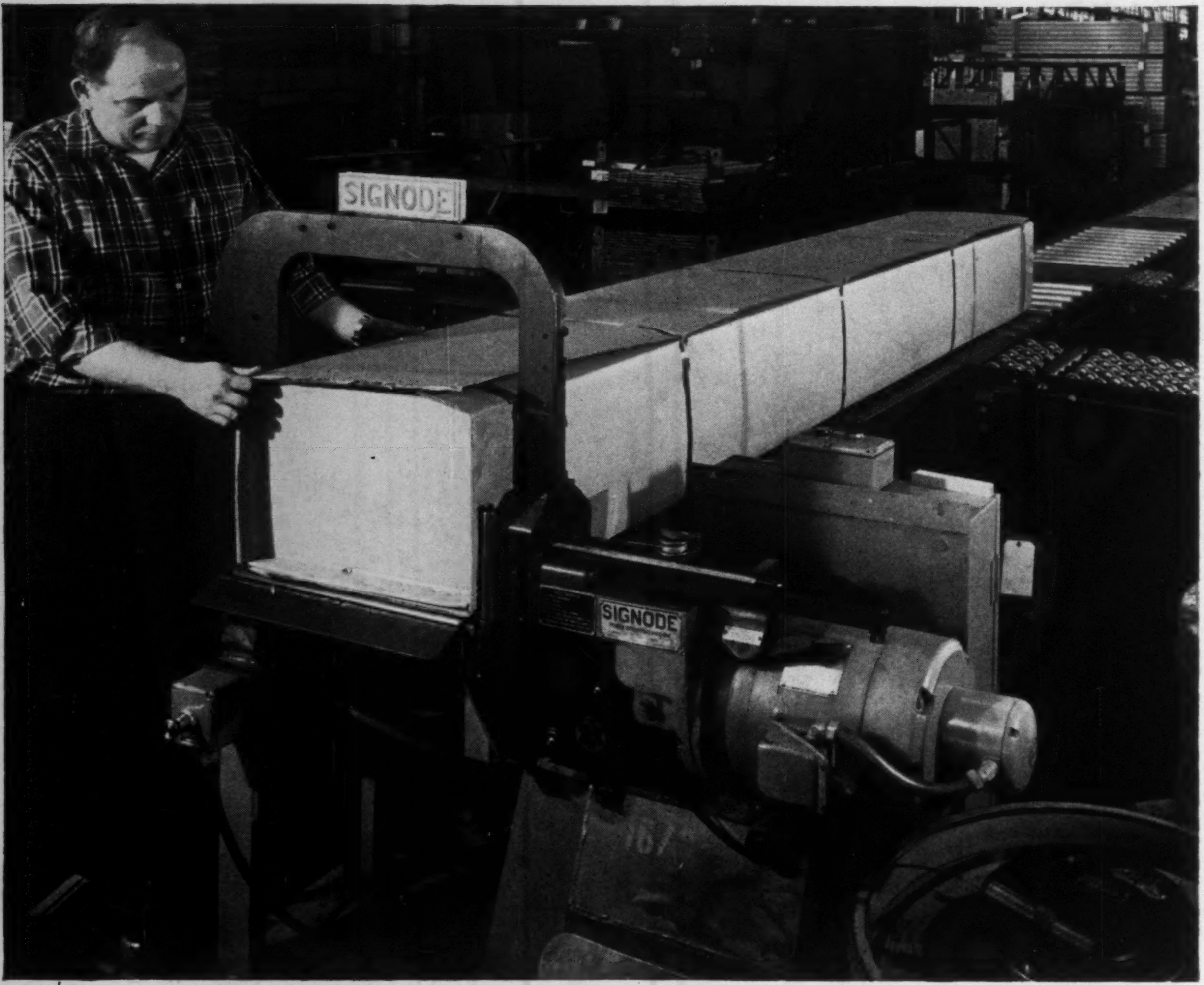

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